AMERICA'S LARGEST TEXTILE MONTHLY

COTTON

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FEBRUARY, 1924

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"Every Knot a Weaver's Knot"
with
AUTOMATIC SPOOLERS
HIGH SPEED WARPERS

Increased Production
Lowered Cost
Better Weaving

BARBER-COLMAN COMPANY
BOSTON, MASS. GREENVILLE, S.C.
MAIN OFFICE AND PLANT
ROCKFORD, ILL. U.S.A.

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The Delivery Bugaboo Banished

DELIVERY on dyed yarns should no longer be a bugaboo to textile mills making colored goods.

In the days when warp dyeing could not be avoided delivery of dyed yarn was a matter of months. It was necessary to place orders for dyeing far in advance of the time when the popular colors for the coming season could be accurately predicted. If you guessed right you made money, if you guessed wrong you lost.

Of course it was not as bad as it might have been because everybody was in the same fix. Warp dyeing was the only method.

Today however the mill that still uses warp dyeing is at a decided disadvantage as compared with the mill that has its yarn dyed by the modern method, the FRANKLIN PROCESS.

This extremely successful process enables us to make delivery on an average of ten days to two weeks. And when necessary we are prepared to make substantial shipments within 2 or 3 days after receipt of yarn. Customers who keep stocks of gray yarn on hand with us frequently get such quick deliveries.

The yarn is wound from bobbins to Franklin Packages. These packages are dyed in the wound form and after dyeing go directly into the V creel for warping. There is no long chain beaming operation at all. It is absolutely eliminated.

Thus we not only save you time but also money.

And the colors are superior. Applied under pressure, Franklin colors completely penetrate the yarn giving unusually solid and brilliant results.

Prompt delivery, a reduction in manufacturing cost, superior colors,—and prices are no more than those of any other process, sometimes less. It is a money making opportunity which demands your careful investigation.

Why not get the complete story? Write for our color cards as a starter. A letter on your business stationery will bring them, also a Franklin representative, if you so specify.

FRANKLIN PROCESS COMPANY

Yarn Dyers · Yarn Merchants · Mfrs Glazed Yarns · Dyeing Machines

Philadelphia · PROVIDENCE · Manchester, Eng.

New York Office 72 Leonard St.

SOUTHERN FRANKLIN PROCESS COMPANY

Greenville, S. C.

Looms Stopped for Shuttles

One serious cause of lost production in many Textile Mills is the enforced stopping of looms for lack of Shuttles or other supplies, the stock of which has been allowed to run low or disappear before a new order is placed.

Our Plan for Monthly Shipments

Is the best kind of security against this loss of production and profits. It does not call for a binding contract, but is a form of placing orders that gives you every protection.

Let's Talk It Over. Our Salesmen and Experts will explain the plan and its advantages.

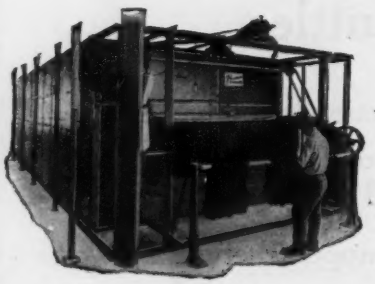
DRAPER CORPORATION

HOPEDALE MASSACHUSETTS

SOUTHERN OFFICE ATLANTA GEORGIA

Copyright 1917 by Draper Corporation

Pioneer Builders of Cotton Dryers, Cotton Waste and Felt Machinery



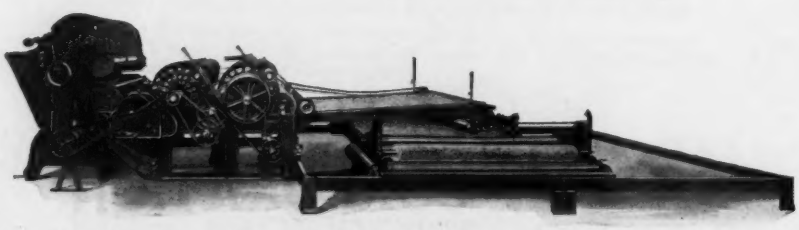
Automatic Skein Yarn Dryer.

Cotton Waste Card

The first "Proctor" Dryer, built over 35 years ago, marked the beginning of modern drying machinery. Today, "Proctor" Dryers are produced in types best for raw stocks, yarns and fabrics of all kinds. The actual number installed exceeds all other makes.

"Smith-Furbush" Felting Machinery, originated over 30 years ago, now comprises 90% of the cotton felt or batt making equipment used on this continent.

The long popularity of "Smith-Furbush" Carding Machines, Willows, Pickers, Pullers, Shredders, Reclaimers, makes it increasingly evident this company is the pioneer-leader in producing Cotton Drying, Felting and Waste Machinery.



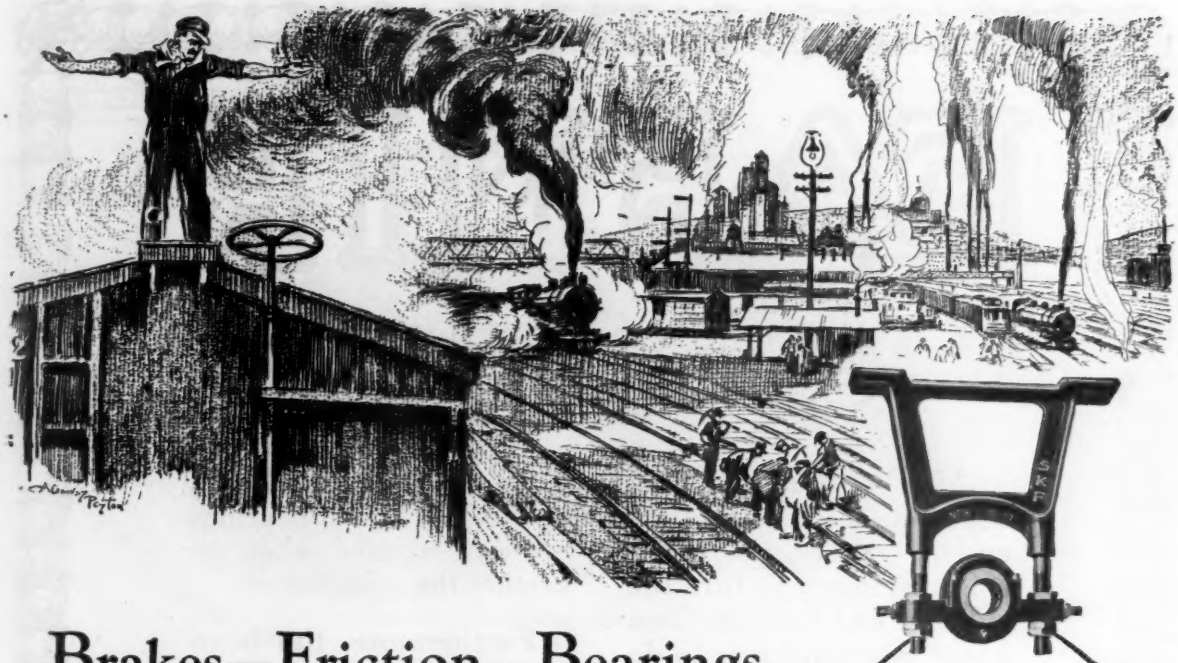
Cotton Felting Outfit

PROCTOR & SCHWARTZ, INC.

formerly

THE PHILADELPHIA TEXTILE MACHINERY COMPANY
SMITH & FURBUSH MACHINE COMPANY

PHILADELPHIA, PA.



Brakes—Friction—Bearings

WHEN the brakeman of a fast moving train signals for the brakes to be applied, the train's motion is retarded by a sliding, dragging area of metal—friction.

When the shafting of your factory turns in babbitt bearings with their long area of metal, each bearing acts like a brake wasting in friction, heat and wear much of the power that should be available for useful work.

Just as a locomotive cannot pull against set brakes—neither can your shafting operate efficiently when its motion is retarded by friction's binding grip.

Let our engineers estimate on an installation for your plant and point out some of the savings that the 9000 users have made by removing the brakes from their line shafting. Skayef Self-Aligning Ball Bearing Hangers always pay for themselves in two years or less.

For Nearest Distributor, See MacRae's Blue Book

1112

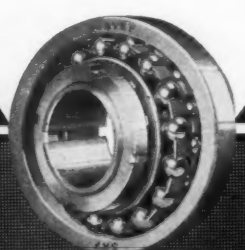
SKAYEF
—the 4-Saving Hanger

1st Saving Skayef Hangers save from 50 per cent upward of the energy which plain bearings consume in friction. This means a saving of 15 to 35 per cent of your power cost.

2nd Saving Considerable time is saved by eliminating shutdowns for replacing or adjusting bearings; forced idleness of machines and men is a cost-factor too big to be ignored.

3rd Saving Lubricant consumption reduced 60 to 80 per cent as compared with plain bearing hangers. Lubricant required only at infrequent intervals and it cannot leak out and ruin belts or product.

4th Saving There is no discernible wear of the hard steel balls and races and absolutely no shaft wear. Dust and grit cannot enter the bearings and Skayef self-aligning ball-bearings have the exclusive inherent ability of compensating automatically for shaft deflections.



SKAYEF
Self-Aligning Ball-Bearing
HANGERS

Made Under **SKF** *Supervision*

THE SKAYEF BALL BEARING COMPANY - - - 165 Broadway, New York City

FAFNIR

Here Is the End Of Your Troubles With Shoddy Picker Bearings

After a shoddy picker has been run a short time and the teeth begin to wear, it is customary to turn the cylinder end for end. You know how hard it is to do that and not get dirt and grit into the bearings—that is with ordinary bearings.

With **Fafnir Ball Bearings** it is different. Look at the illustration carefully and you will see that the bearing is mounted in a dust proof, unit housing which is entirely independent of the split pillow block. In this way, the bearings are not exposed when reversing the cylinder.

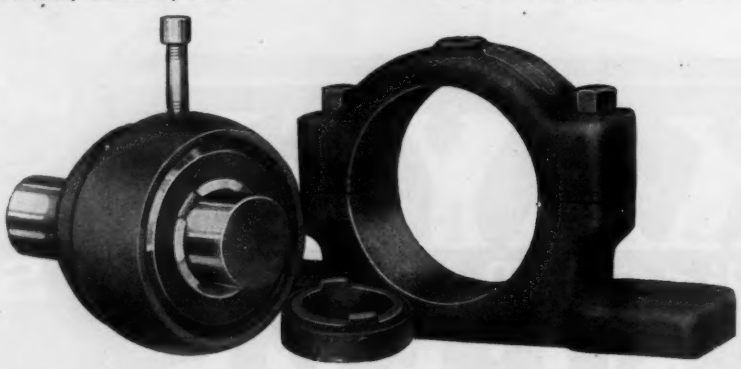
Furthermore, the bearing and housing align perfectly with the shaft as a unit in the pillow block removing all danger of cramping.

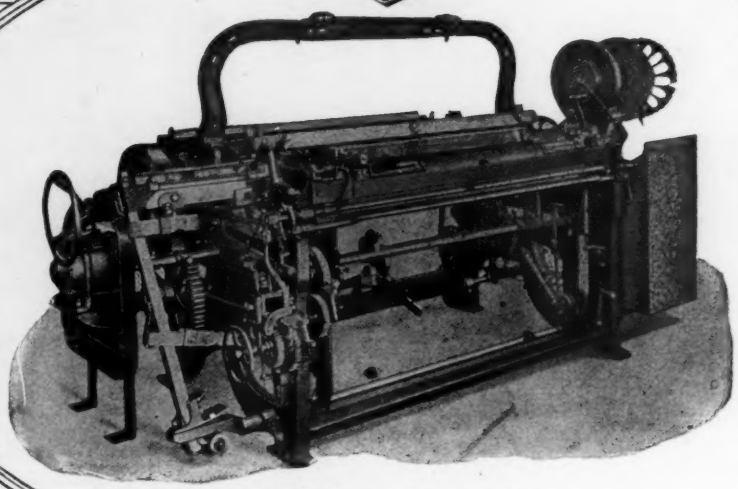
We suggest that you write to us for further information and prices of this ideal shoddy picker application.

THE FAFNIR BEARING COMPANY
New Britain, Conn.
Southern Representatives

O. R. S. POOL,
220 Vail Avenue, Charlotte, N. C.

A. G. LAUGHRIDGE,
P. O. Box 1847, Atlanta, Ga.





Stafford bobbin-changing plain goods loom.

Stafford Looms Increase Production

We manufacture a complete line of automatic looms, both shuttle and bobbin-changing for weaving practically every type of fabric that can be made with a single shuttle. ¶ Stafford shuttle-changing looms will handle cop filling just as successfully as bobbin filling. We have a loom for every kind of yarn, coarse or fine, and for practically every variety of fabric, plain or fancy.

THE STAFFORD COMPANY

WEAVING MACHINERY

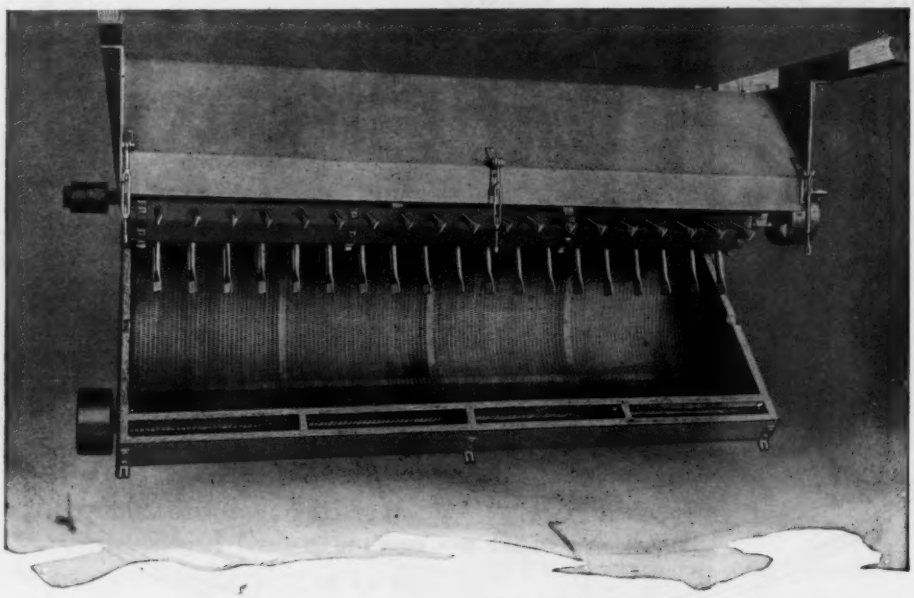
READVILLE, MASS.

Branch Office
502 Colt Building
Paterson, N. J.

Southern Agent
Fred H. White,
Charlotte, N. C.

Canadian Representative
Whitehead, Emmans, Limited
Montreal

AUTOMATIC STAFFORD LOOMS



Put Your Conveyor Pipe to Work

You can give your cotton a thorough cleaning, opening and aerating, while it's being conveyed from the bale breakers to the picker room. The Murray Cotton Cleaning and Aerating Machine forms a part of the conveyor pipe, and vastly improves the stock before it is fed to the pickers.

The "Murray" takes up very little extra space since it can be hung from the ceiling. Its supply of cotton is drawn through it by the suction of the conveyor pipe fan, no addi tional fan or increased draft being necessary. A further economical feature is the fact that the "Murray" requires practically no attention since the dirt is automatically disposed of through a chute at one end.

Handles 2,500 Lbs. Hourly.

2,500 pounds of cotton per hour can be cleaned, opened and aerated in the Murray machine at a power expenditure of only 3 to 5 H.P. The stock is given a thorough treatment by 114 revolving arms.

The Bowling Green Spinning Mills write us stating "The Opener we purchased from you is giving entire satisfaction in every way. In fact we think it is a wonderful machine."

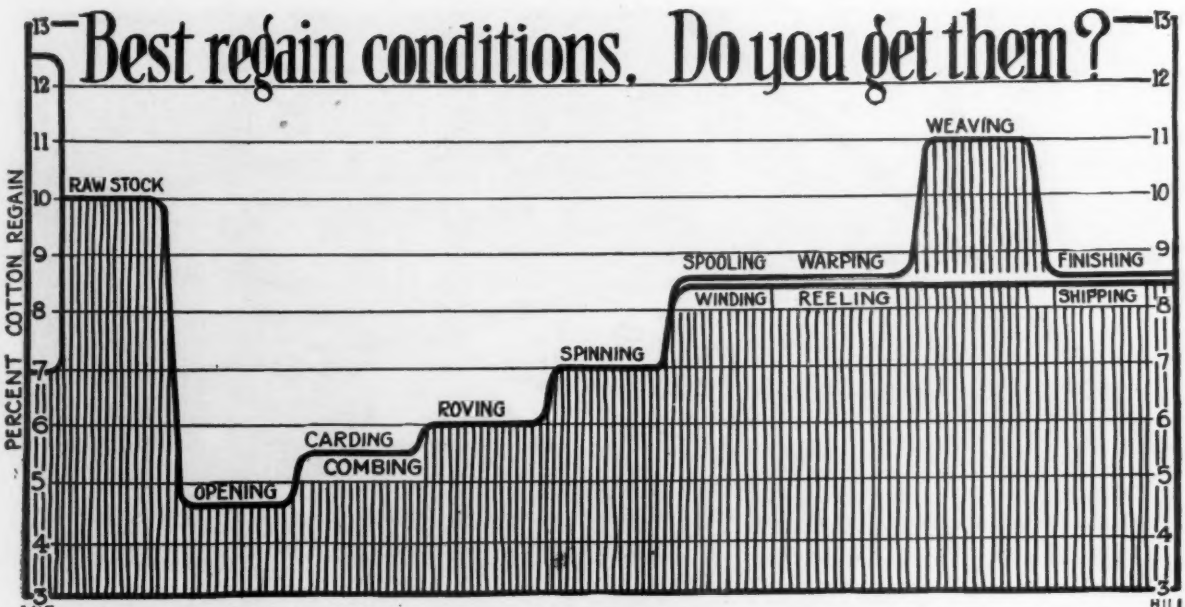
THE MURRAY COMPANY, ATLANTA, GA.

Northern and New England Sales Representatives:
Aldrich Machine Works
P. O. Box 132, Providence, R. I

Carolina Sales Representatives:
Carolina Specialty Co.
Brevard Court
Charlotte, N. C.

The Murray (PAT. PENDING)
COTTON CLEANING AND AERATING MACHINE

COTTON WELL OPENED IS HALF SPUN



Thirsty Cotton and What It Costs You

Cotton comes to you containing a certain amount of moisture. You paid for it as cotton. From seven to twelve percent of it was water. Whatever you shrink in water—you make up in cotton. Do you know how much?

Look at the chart. In the very first process—opening—most of the moisture is lost. The cotton actually becomes thirsty.

Humidifiers put this moisture back. This must be done gradually—step by step. Finally in your yarn or your cloth—the loss may be made up—Regained.

ParkSpray humidifiers accomplish this if installed and operated as we recommend. Look at the chart again. Results less than these come out of your profits.

Look at the right hand side of the chart. This shows what the moisture content should be in the last step of manufacture. The goods are made. They are ready to ship.

Suppose your regain at this point is down to 4 percent; it frequently is in some plants even with humidifiers. Let us figure out what you lose by not having ample humidifier capacity, automatic regulation, and a scientific approach to your definite problem. With cotton at

15c you lose $3.08 on each bale
20c " " 4.12 " " "
25c " " 5.16 " " "

These losses are figured at the prices of your raw material—not on the selling prices of your finished article. These losses are figured on your raw material shrink. They do not take into account the manufacturing losses and perplexities that accompany.

You may buy humidifiers on price only. Thirsty cotton costs you more than you save in so doing.

There is just the right amount of moisture needed for each manufacturing operation—for you. There is just the right way to determine what this is. We would rather you would have the right equipment at a fair price than inadequate equipment at any price.

Would you be interested to find out what "moisture content" losses you now have—and how to prevent them?

Write for Bulletin No. 1921.

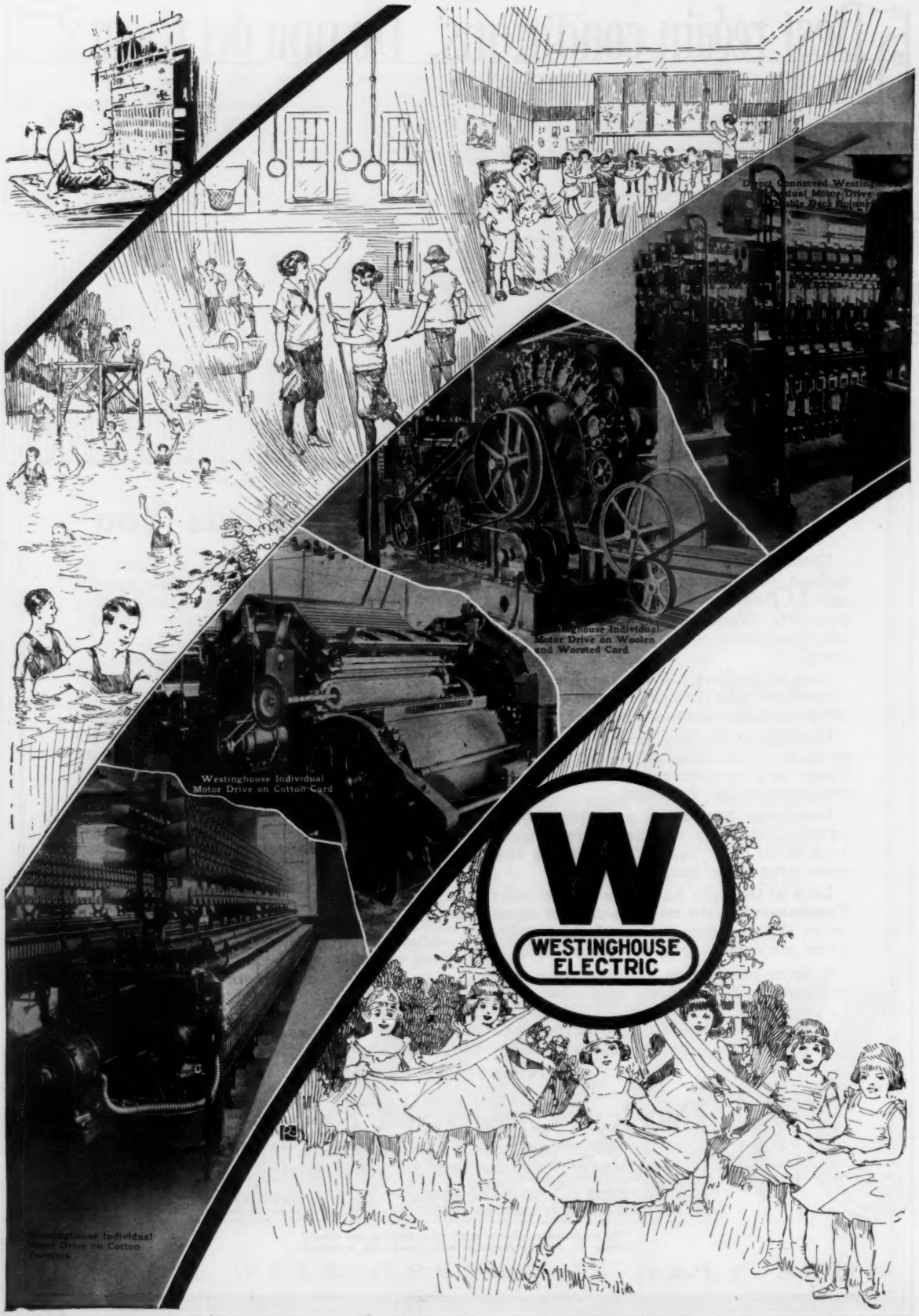
Parks-Cramer Company

Engineers & Contractors

Industrial Piping and Air Conditioning

Fitchburg Boston Charlotte

The statements above, with changed figures would apply to paper, tobacco, silk, wool and worsted.


Westinghouse Individual
Motor Drive on Cotton Card
W
WESTINGHOUSE
ELECTRIC

Westinghouse Individual Motor Drive on Cotton Comber
Westinghouse Individual Motor Drive on Cotton Pickers
Westinghouse Individual Motor Drive on Worsted Ring Spinning Frames
Westinghouse Individual Motor Drive on Cotton Spinning Frame

Hand in Hand

Physical and Industrial Development

The excellent working and living conditions, the recreational facilities, the educational opportunities and the community welfare work which generally prevail in the textile industry, show that the humanitarian side has developed hand-in-hand with the great industrial advancement of the past decade.

It so happens that the means employed to increase production and to improve the quality of textile products have aided, both directly and indirectly, in bettering working conditions—in improving lighting and sanitary conditions, and in removing the danger of injury in the spinning room.

Electric drive has been he means employed and the benefits it has brought to the employer have naturally reacted to the benefit of the employe.

Starting with the development and introduction of the alternating current motor (which made the electrification of this industry possible) Westinghouse has worked earnestly with complete electrification its ultimate goal. Step-by-step it has been accomplished.

The individually motor-driven silk spinner, worsted card and cotton card are the latest Westinghouse contributions; and with them the complete electrification of the textile mill has been fully realized.

In all branches, the forward movement of the industry has had the generalship of men of high ideals.

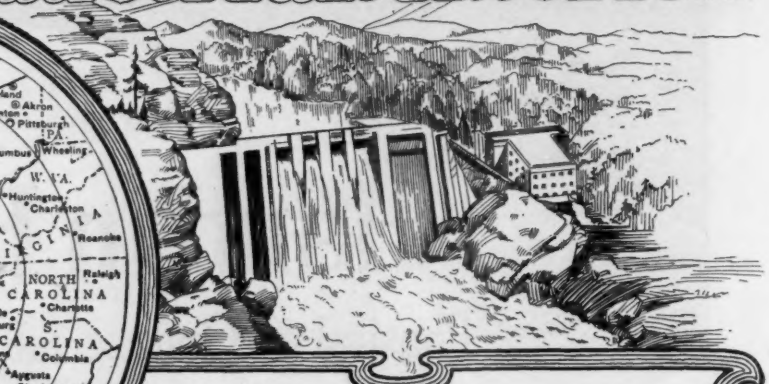
The Westinghouse organization at East Pittsburgh is constantly studying textile problems from the standpoint of both the employer and the employe.

Consultation on any electrical power problem is always welcomed.

Westinghouse Electric & Manufacturing Company
East Pittsburgh . Pennsylvania
Sales Offices in All Principal Cities of the
United States and Foreign Countries

Westinghouse

Tennessee - The Heart of Industrial America



Going South?

No doubt you are considering it, as are many textile executives, and the question at once resolves into "What part of the South?"

There is no more desirable or ideal location for industrial plants in America today than Tennessee. Ideal sites are available in scores of localities, either in or adjacent to progressive, modern cities, or where mills can develop self-contained communities and mill villages at a minimum cost. Land costs are lower in Tennessee, much lower than corresponding lands in other parts of the country. Building costs are lower, for Tennessee produces construction materials of every nature almost at your back door, and lower living costs insure labor for construction purposes at lower wages.

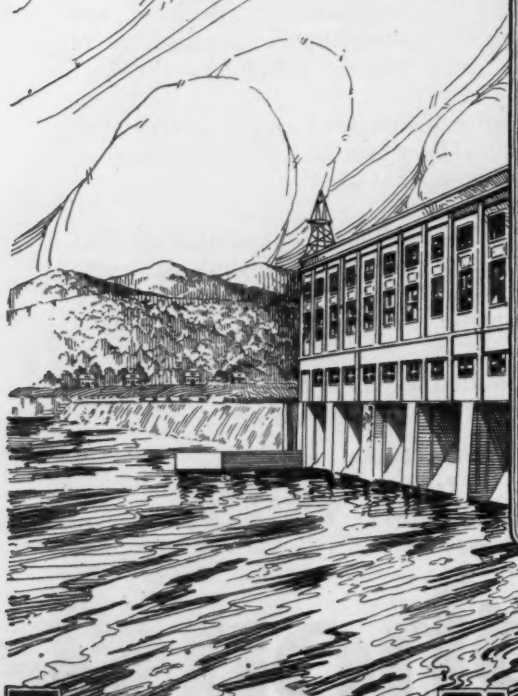
Manufacturing costs in Tennessee are lower than elsewhere because of the unlimited quantities of raw materials of all kinds available there—because of the adequate supply of intelligent and stable native labor—the unexcelled rail and water transportation facilities—the abundant economical hydro-electric power—and the ideal climatic conditions the year around.

Tennessee is already a great center of diversified textile operations, as nearly 150 mills are flourishing in Tennessee and those mills that depend upon other branches of the industry for co-operation can find such assistance there.

Complete information about Tennessee and why it should be selected as the location for your new mill or branch unit will be gladly sent you on request.

THE TENNESSEE ELECTRIC POWER CO.

CHATTANOOGA, TENN.



The Tennessee Electric Power Co.

ANNOUNCEMENT

THE Hazle Brook Coal Company, the Stonega Coke and Coal Company and the Wentz Company have bought all of the stock of the GENERAL COAL COMPANY, a Delaware Corporation, and after January first, Nineteen Twenty-Four, will operate it under their management.

The GENERAL COAL COMPANY will conduct the business formerly transacted by the Wentz Company and will be the exclusive Sales Agent for "ADMIRALTY," "RODA" and "STONEGA" coal and coke produced by the Stonega Coke and Coal Company, and for the "DEPENDABLE" Anthracite Coal produced by the Hazle Brook Coal Company.

Admiralty Coal
New River
Smokeless

DEPENDABLE
COAL
Anthracite

GENERAL COAL COMPANY

1727 Land Title Building
PHILADELPHIA

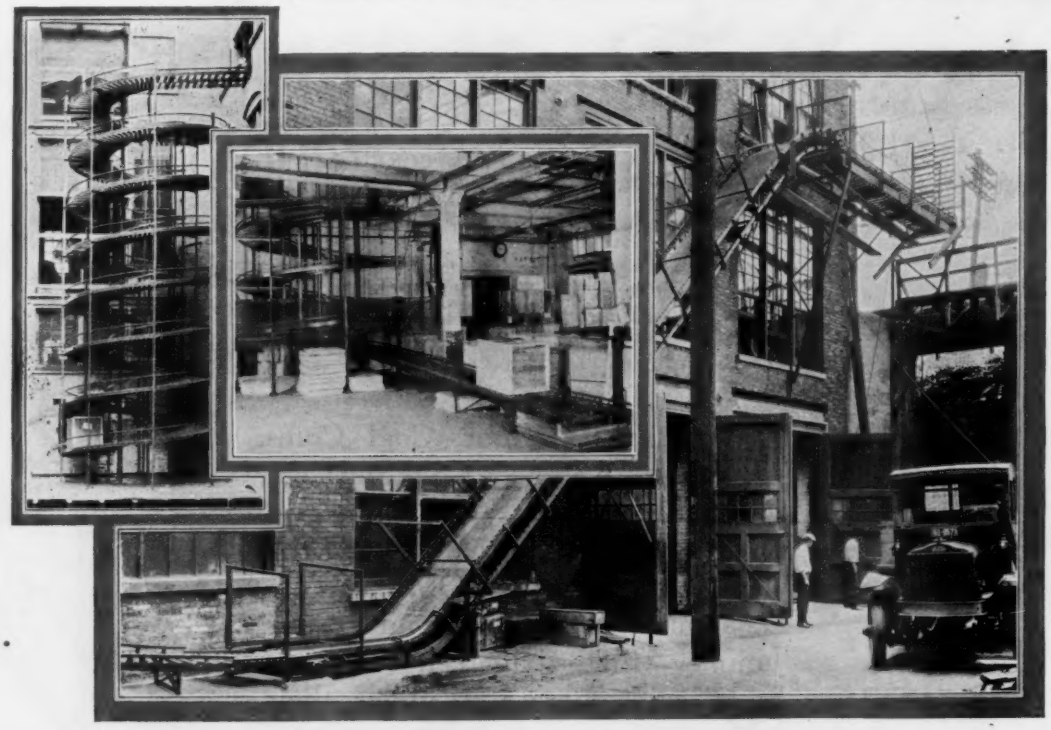
EXCLUSIVE SALES AGENT
—FOR—
STONEGA COKE AND COAL CO.
HAZLE BROOK COAL CO.
—AND—
SUCCESSOR TO BUSINESS OF
WENTZ COMPANY

BUNKER COAL
Supplied at
Baltimore, Md.
Charleston, S. C.
Jacksonville, Fla.
Norfolk, Va.
Savannah, Ga.

BOSTON
CHARLESTON
CHARLOTTE

DETROIT
NEW YORK
NORFOLK

EXPORT & COASTWISE COAL
Loaded at
Baltimore, Md.
Charleston, S. C.
Norfolk, Va.



From Top Floor—to the Cars —with Savings at Every Step

CAN you picture a smooth, convenient flow of products through your plant without a lost moment in transportation, or any manual labor except for loading and unloading? That's what this Mathews Conveying System has done for the Burson Knitting Company of Rockford, Illinois. Mathews Carriers have eliminated all handling of goods by slow elevators, truckers and trucks, from the time boxes leave the packing room on the fourth floor, until they are stored in a freight car ready to ship. At every step in this installation a definite saving was made, both in handling time and in cost of trucks and labor.

Boxes open on two sides, ride with absolute safety on the spiral conveyor—centrifugal force and specially made double rollers keep them in perfect position. In the packing room Mathews equipment has added another point to economy. The open boxes can be closed, weighed and marked without removing from the conveyor. Some boxes are put away for stock, the rest are caught by the push-bar elevator outside the building and deposited on a freight car on the elevated siding above. Previously, a five-ton truck had to carry the shipping cases several blocks to a loading station.

Your handling problem may be simpler, or perhaps a great deal more complicated. But Mathews equipment can save for you as it did for the Burson Knitting Company, not only in speeding up material handling but in cutting many dollars from the pay-roll.

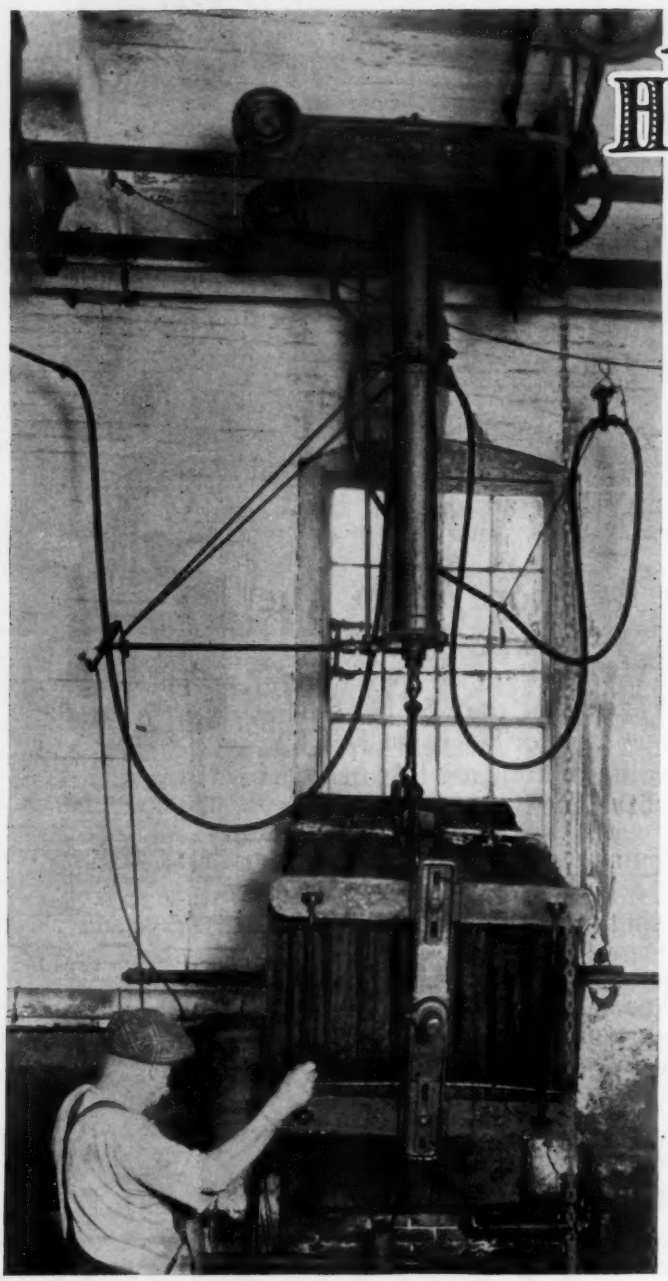
Apply these facts to your handling problem. Is there a place in your factory where Mathews conveyors could solve a similar problem for you and add many dollars to your profits? A Mathews man will gladly consult with you, or, if you wish, a catalog showing types of equipment adapted to every use will be sent you. A letter gives you prompt attention.

Mathews Gravity Carrier Co.

162 10th St. **Ellwood City, Pennsylvania**

CURTIS

AIR HOISTS



Used in The Textile Industry

Curtis one man All Steel Air Hoists and Curtis Roller Bearing Trolleys are effecting important economies in leading textile mills throughout the country.

Why not install a Curtis Air Hoist and operate it with the air you now have available? The wide variety of uses to which Curtis equipment can be most economically applied is worthy of your immediate investigation.

Curtis Pneumatic Machinery Company

1571 Kienlen Ave., St. Louis, Mo.

Branch Office

532-R Hudson Terminal, New York

CURTIS
AIR COMPRESSORS-HOISTS-TROLLEYS-CRANES
ST. LOUIS

Established 1854

"That American Storage System is *Certainly Saving* Our Oils!"

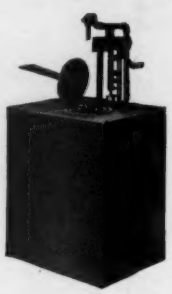
"You remember, they said we might be in the average class, wasting only 50 per cent of value in our oils,"—(it was the superintendent talking to the president)—"well, here's our first monthly report and we must have been losing more than that through evaporation, leakage, spilling and gumming. That American Storage System is CERTAINLY SAVING our oils."

Your Losses May Be More Than The Average of "50% Wastage Yearly"

In some places the wastage is smaller than 50 per cent—in others it is larger—whether more or less it is COSTLY, because expensive oil and valuable time are lost in either case—a loss that can POSITIVELY be prevented.

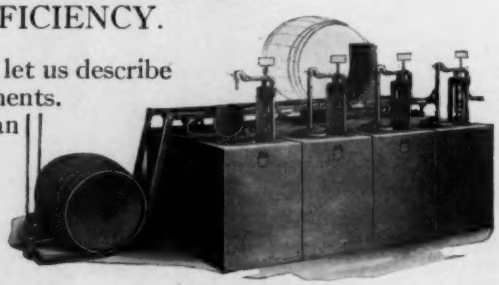
The American System will make savings enough to PAY ITS COST in a short time. It is the modern, efficient way of storing and dispensing oils. It insures CLEANLINESS, CONVENIENCE and EFFICIENCY.

Write us the extent of your oil needs and let us describe an outfit to meet your special requirements. Ask for Bulletin 202—tells how you can reduce oil wastage.



Cut 36, Pump with meter attached

A convenient manner for storing and serving oil into containers in exact quantities. Heavy, durable, construction; discharges quart or pint at single stroke. *Ask for Bulletin 400.*



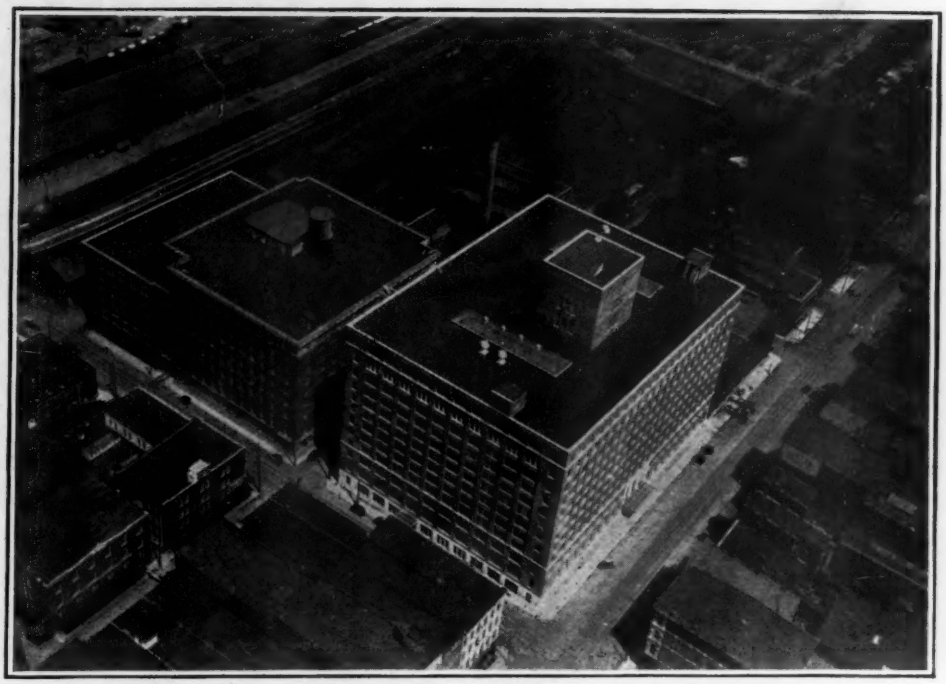
Cut 12. First Floor Battery Outfit with Single Acting, Quart Measuring Pumps

The American Oil Pump & Tank Company

1179 Findlay St., Cincinnati, Ohio

Viskalt Membrane Roof

Pliant Under Stress



The Belknap Hardware and Mfg. Co., Inc. Building, Louisville. Graham, Anderson, Probst and White, Architects, Chicago. Struck Construction Co., Louisville, Builders

—covers this new business block in Louisville

THE new home of the Belknap Hardware and Manufacturing Company, Inc., Louisville, Kentucky, is assured of permanent weather protection by a Viskalt Membrane Roof.

Each of the twelve floors of this new building covers an area of 55,000 square feet, making this one of the largest buildings devoted to the hardware industry in the United States.

That the architects, Graham, Anderson, Probst and White, of Chicago, and the officials of the Belknap Company, after thorough investigation, agreed on a Viskalt Membrane Roof for this building shows how generally Viskalt is recognized as the logical covering for business structures. Moderate cost of application plus years of endurance make it doubly economical and satisfactory.

Fifty-five years of manufacturing experience are back of the materials used in a Viskalt Membrane Roof. There is a Viskalt Compound for every waterproofing need. Architects, engineers, and owners may have complete specifications by applying to the Construction Materials Division, Dept. 44-K, 1008 Fisk Building, New York City.

The RICHARDSON COMPANY

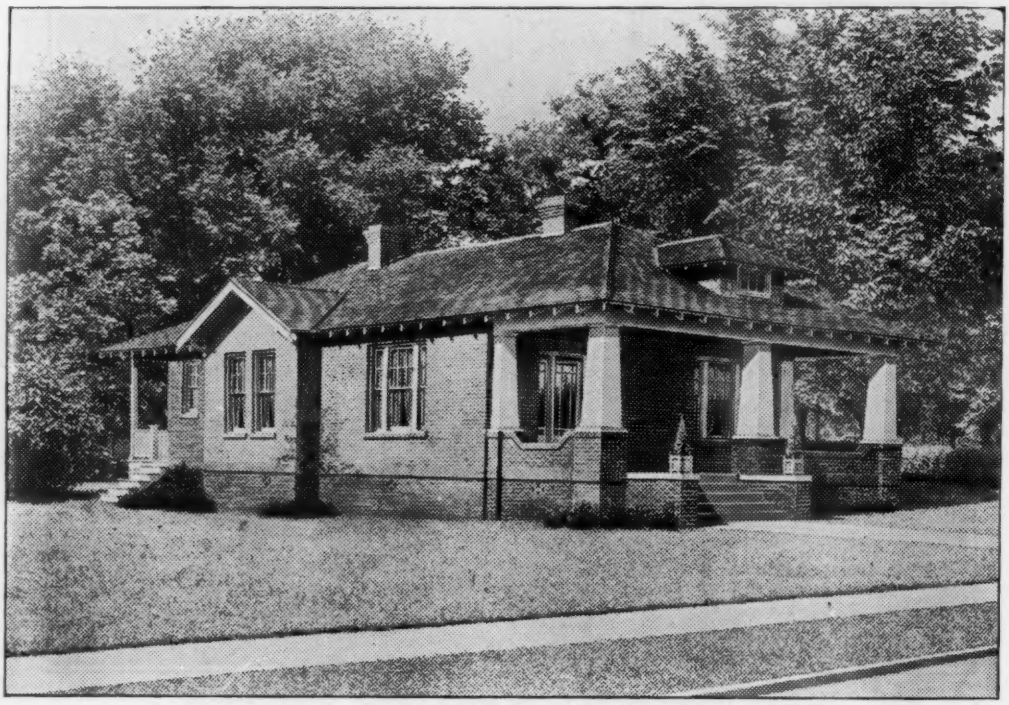
Lockland (Cincinnati), Ohio

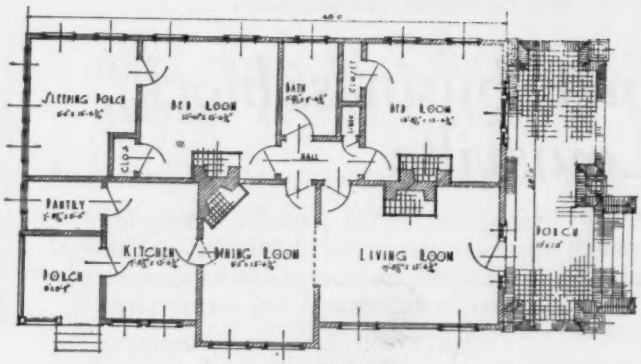
Chicago New Orleans New York City Atlanta Dallas

RICHARDSON ROOFING

© 1924, The Richardson Company

We Handle Every Building Detail





FLOOR PLAN
of the Minter Home Illustrated Above

Type of Minter Home selected for Superintendent's Residence by a leading Textile Firm. Exterior finish of this attractive home may be either brick veneer, as shown, or in wood.

You are delivered completed homes when you place your housing in our hands. Only one contract is necessary.

No matter what your building needs may be—one and two-story community houses, churches, stores, school houses, moving picture theatres, apartment houses or other structures—you can have them erected in exact accordance with your plans or those of your architect without being troubled by any detail.

All Minter structures are built of the best materials of the kind specified, are erected in minimum time and without loss of time, labor or materials.

The Minter System is the modern method of building that saves your time, your nerves and the money of you and your stockholders.

Write us today about the houses you need.

THE MINTER HOMES CO.
GREENVILLE, SOUTH CAROLINA

MINTER HOMES CORPORATION
HUNTINGTON, WEST VIRGINIA

What's Mileage -in a *Paint* Can?

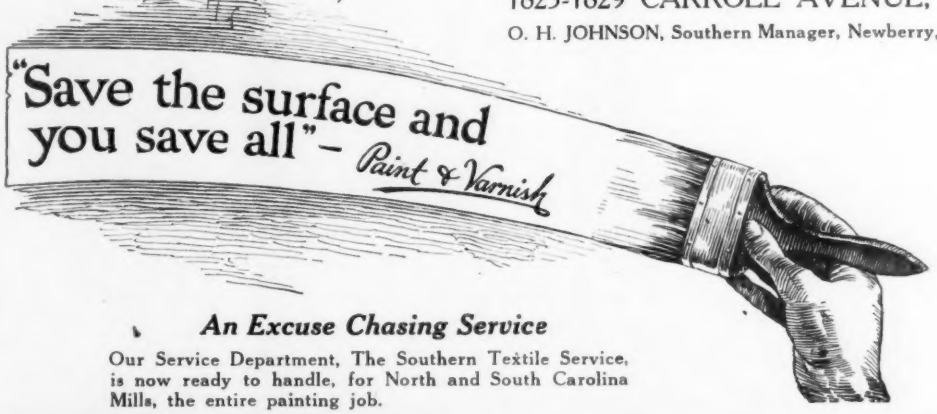
How far will it go; how long will it last? Without any ifs or ands, the answer to these questions is the paint's mileage.

There is nothing scientific about buying paint by its mileage. It is just good business. Paint mileage means you are buying a known quantity—a definite number of square feet covering capacity; a minimum number of years service.

Hockaday covers 10 to 15 per cent further. A comparative test will bear this out. Hockaday's average life is 8 years.

Cheerfully we'll send you "Paint Mileage," the book of facts. Just write on your letterhead.

THE HOCKADAY COMPANY
1823-1829 CARROLL AVENUE, CHICAGO
O. H. JOHNSON, Southern Manager, Newberry, South Carolina



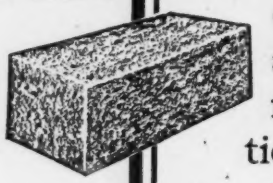
An Excuse Chasing Service

Our Service Department, The Southern Textile Service, is now ready to handle, for North and South Carolina Mills, the entire painting job.

HOCKADAY

THE WASHABLE PAINT FOR ALL INTERIORS

How many years do you want to use it?



WHEN you are buying a pavement—whether for a community or for an industry—that is a fair first question to ask yourself.

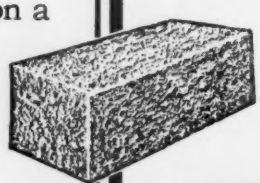
If the answer is one, three or four years, obviously it doesn't matter much what you choose. Almost any pavement will last that long, though some will require repairs and upkeep even within that period.

On the other hand, if it is a pavement that you want to last ten or twenty years or more, then it is wise and foresighted buying to lay a *vitrified brick pavement* and free yourself in advance from the steady and serious drain of maintaining less durable substitutes.

First cost may *look* big on a paving job but upkeep cost actually *adds up bigger* if you pick the wrong material.

NATIONAL PAVING BRICK MANUFACTURERS ASSOCIATION
ENGINEERS BLDG. CLEVELAND, OHIO

Albion Shale Brick Company
Albion, Ill.
Alton Brick Company
Alton, Ill.
Barr Clay Company
Streator, Ill.
Binghamton Brick Company
Binghamton, N. Y.
Cleveland Brick & Clay Company
Cleveland, Ohio
Clydesdale Brick & Stone Co.
Pittsburgh, Pa.
Coffeyville Vitrified Brick & Tile Co.
Coffeyville, Kans.
Collinwood Shale Brick Company
Cleveland, Ohio
Corry Brick & Tile Company
Corry, Pa.
Francis Vitric Brick Company
Boynton, Okla.
Georgia Vitrified Brick & Clay Co.
Augusta, Ga.
Globe Brick Company
East Liverpool, Ohio
Hammond Fire Brick Company
Fairmont, W. Va.
Hocking Valley Brick Company
Columbus, Ohio
Independence Paving Brick Co.
Independence, Kans.
Mack Mfg. Company
Wheeling, W. Va.
C. P. Mayer Brick Company
Bridgeville, Pa.
Medal Paving Brick Company
Cleveland, Ohio
Metropolis Paving Brick Co.
Pittsburg, Kans.
Metropolitan Paving Brick Co.
Canton, Ohio
Mineral Wells Paving Brick Co.
Mineral Wells, Texas
Moberly Paving Brick Company
Moberly, Mo.
Murphysboro Paving Brick Co.
Murphysboro, Ill.
Patton Clay Mfg. Company
Patton, Pa.
Peebles Paving Brick Company
Portsmouth, Ohio
Pittsburg Paving Brick Company
Pittsburg, Kansas
Purington Paving Brick Company
Galesburg, Ill.
Southern Clay Mfg. Company
Chattanooga, Tenn.
Springfield Paving Brick Company
Springfield, Ill.
Sterling Brick Company
Olean, N. Y.
Streator Clay Mfg. Company
Streator, Ill.
Thornton Fire Brick Company
Clarksburg, W. Va.
Thurber Brick Company
Ft. Worth, Texas
Toronto Fire Clay Company
Toronto, Ohio
Trinidad Brick & Tile Company
Trinidad, Colo.
Veedersburg Paver Company
Veedersburg, Ind.
Western Shale Products Company
Fort Scott, Kans.
Westport Paving Brick Company
Baltimore, Md.



VITRIFIED Brick PAVEMENTS OUTLAST THE BONDS

A Model of Manufacturing Efficiency

THIS is the new dye-house and finishing building of the Phoenix Hosiery Company at Milwaukee, *one of the largest single units in the country devoted entirely to hosiery finishing.* The building is a model of manufacturing efficiency.

Location of the dye-house at the top of the building assures a maximum of natural light and ample ventilation, and keeps the vapor and fumes from other parts of the building. Stock is raised at one lift from the undyed stockroom in the basement to the dye-house on the 7th and 8th floors, and then is carried by gravity to the other operations on the floors below.

Boarding, mating and boxing rooms are located on the 4th, 5th and 6th floors, so arranged as to provide a minimum amount of handling of boarded goods.

Meeting difficulties, and in many cases turning them to advantage, is one part of the service of Lockwood, Greene & Co. In overcoming the obstacles encountered in designing the Phoenix Hosiery building, Lockwood, Greene & Co. were aided by years of experience as textile mill engineers and managers. More detailed information about this building and others of equal interest will be provided on request. A Lockwood-Greene representative will be glad to call and discuss your own building problems.

BUILDING WITH FORESIGHT

LOCKWOOD, GREENE & CO.
ENGINEERS

EXECUTIVE OFFICE, 24 Federal Street, BOSTON 9

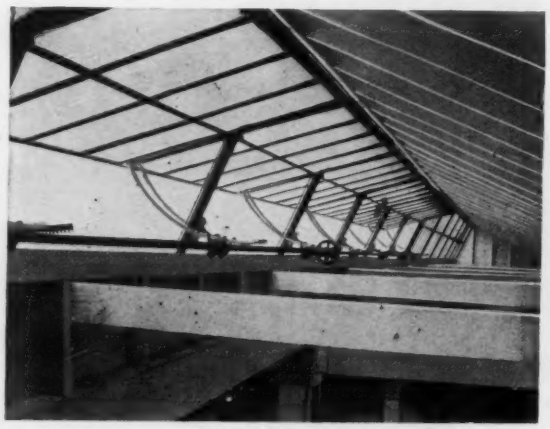
BOSTON	ATLANTA	CHICAGO	NEW YORK
DETROIT	CLEVELAND	CHARLOTTE	SPARTANBURG, S. C.

Lockwood, Greene & Co. of Canada, *Limited*, Montreal

Compagnie Lockwood Greene, Paris, France

GEORGE DOWMAN

610-611 Walton Building, Atlanta, Ga.



Better Ventilation

Plenty of fresh air without draft or dust is a wonderful stimulus to production. Both old and new buildings may be easily equipped with

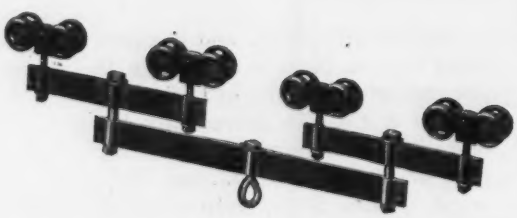
Callahan Sash Operators

For any type of pivoted or hinged wood or steel sash. We have an Engineering Department that will work with you or your architect in the development of plans. Let us give you an estimate.

THE T. J. CALLAHAN CO.

804 S. Perry St. Dayton, Ohio

WAGNER OVERHEAD CONVEYING EQUIPMENT



IS IDEALLY ADAPTABLE TO COTTON MILL OPERATIONS
CONSERVES LABOR---SAVES TIME AND FLOOR SPACE

Do your trucking on the ceiling and consolidate your conveying and hoisting operations.

Wagner Equipment includes a complete line of Switches, Crossovers, Curves, and Cranes. Carriers are equipped with high grade roller bearings and can be furnished with "Hyatt" Roller Bearings if desired.

Write for Catalogue

Wagner Manufacturing Company, Cedar Falls, Iowa.

One of Ten School Buildings

for City of New York in which

BOCA SOLID STEEL SASH Has Been Installed.

For High Class construction, quality and service, you can depend upon Boca Sash.

Catalogue on request.

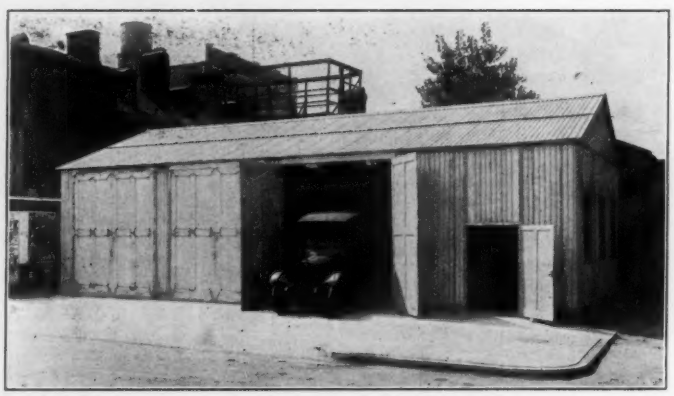
THE BOGERT & CARLOUGH CO.

Paterson, N. J.

Southern Selling Agent for the Products on These

CONTRACTORS AND SALES ENGINEERS

A Plant Garage and Repair Shop



A Maryland Metal Three Car Garage and Equipment Storage built for the Fleischman Yeast Company.

Fire-proof, lightning-proof and rust-resisting, because made exclusively of

Lyonore Metal

conveniently placed for storage and repair of your trucks can be had at a reasonable price.

A MARYLAND METAL BUILDING of this type, should plant expansion necessitate, can be moved at a salvage of 100 per cent, or easily enlarged to any size required.

MARYLAND METAL GARAGES are furnished complete, to house one or a hundred cars.

Tell us your requirements and we will be pleased to submit plans and prices.

MARYLAND METAL BUILDING COMPANY

Main Office and Factory

McComas and Race Streets
Baltimore, Md.

416 Crozer Bldg.
Philadelphia

160 Broadway
New York

GEORGE DOWMAN

610-611 WALTON BLDG.,

ATLANTA, GA.

"DOWMAN SERVICE" IS KNOWN ALL OVER THE SOUTH. TAKE ADVANTAGE OF THIS SERVICE WHEN IN NEED OF ANY OF THE FOLLOWING:

FIRE PROOF DOORS
SOLID STEEL SASH
HOLLOW METAL WINDOWS
STEEL CASEMENTS
VENTILATORS
METAL CEILINGS

STEEL BUILDINGS
METAL LATH
STEEL FENCE
SASH OPERATORS
OVERHEAD CARRIERS
ETC.

SEND FOR CATALOGS AND PRICES

Pages—Quality Products plus "Dowman Service"

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SYRACUSE, N. Y.
Alexander Grant's Sons & Co.

UTICA, N. Y.
American Hard Wall Plaster Co.

WOONSOCKET, R. I.
Pinault & Choquette

"Save the surface and you save all"

More Light!

AN abundance of natural light, properly refracted and diffused, is most essential in the modern textile mill.

OJACO MILL WHITE, applied to walls and ceilings, gives more light by intensifying the sun's rays to the 'nth degree. Light is more evenly distributed to every corner and lighting costs are reduced to a minimum.

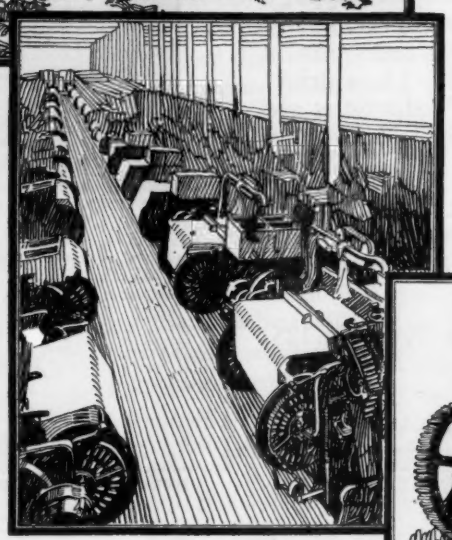
For further details concerning the effectiveness and economy of OJACO Mill White for all textile mill interiors, consult the nearest OJACO distributor listed opposite, or write to us direct.

Oliver Johnson & Co., Inc.
Paint Makers since 1833
PROVIDENCE, R.I.

THE FUNCTIONS OF THE ENGINEER

TO PRODUCE BETTER FABRICS AT LOWER COST

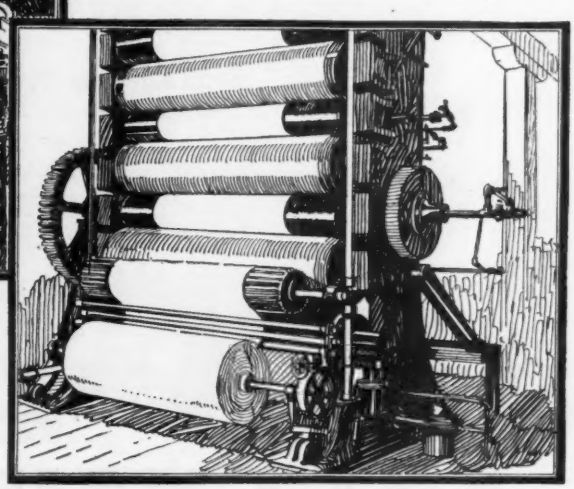
S SERVICE



THE quality of almost every finished product is dependent upon workmanship as well as grade of raw material. Workmanship in the production of fabrics involves processes and machinery and is an equal, if not a greater factor, as the highest quality of raw material may result in rejects or seconds, without adequate mechanical equipment and care in the manufacture.

An economy resulting from increased production per operative and increased production per unit of power, can often be obtained by an analysis of existing conditions and then by drawing the proper conclusions of what is to be done. The Engineer with a broad experience in solving industrial problems can frequently make suggestions that will produce better fabrics at a lower cost.

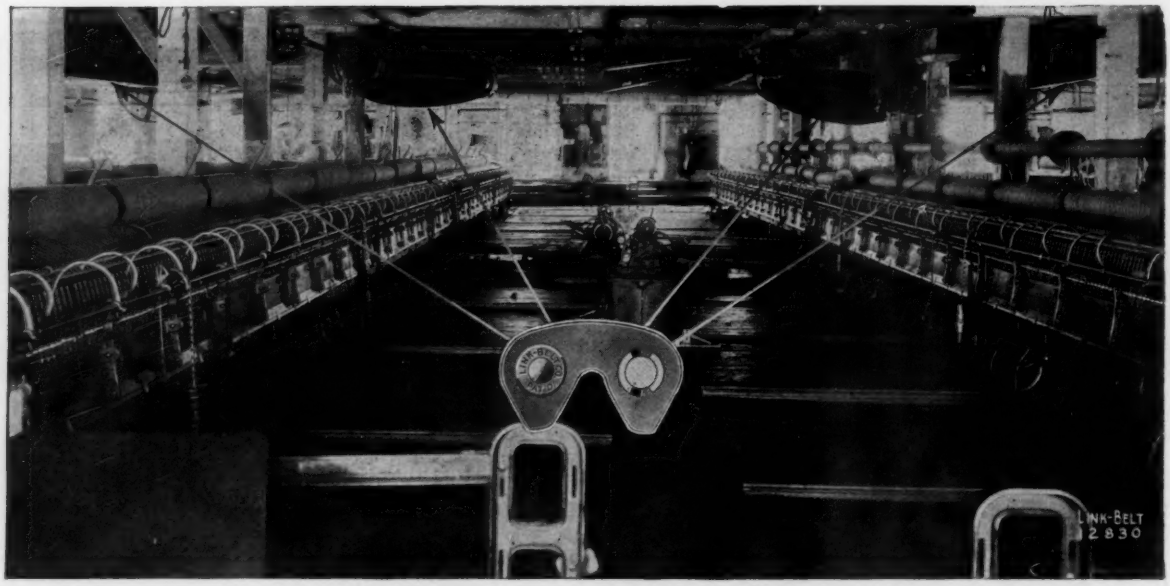
A new and revised edition of our books, "Picks to the Minute," on the textile industry and "Factories for the Future," will be mailed upon request; or better still, make an appointment for a member of this organization to confer with you. This involves no obligation.



J. E. SIRRINE & COMPANY

Engineers

Greenville South Carolina



"Running Steadily and Efficiently Since 1914"

By Robert Calhoun, Chief Engineer

John and James Dobson, Inc., Philadelphia, Pa.

"AT OUR Falls Schuylkill Mill we have more than 80 Link-Belt Silent Chain Drives in daily operation. They operate every type of machine and range from 5 to 75 H. P.

"Although they have been running steadily since 1914, usually above their rated capacity, we have never had a layup or delay due to them—and they are still in splendid shape.

"Link-Belt Silent Chain Drives are ideal for either individual or group motors. They eliminate all slippage and increase production. Any desired speed reduction is obtainable with this drive. Many of our reductions are from 1700 R.P.M. to 105 R.P.M.

"Link-Belt equipment is standard with us—not only in this mill but all of our mills."

Send for Data Book No. 125. Use the coupon.

LINK-BELT COMPANY
910 S. MICHIGAN AVENUE CHICAGO
(OR NEAREST OFFICE LISTED BELOW)

Please send postpaid—Link-Belt Silent Chain Data Book No. 125.

Name _____

Firm _____

Street _____

Town _____

State _____ (COTTON)

RETURN THIS COUPON

LINK-BELT COMPANY

PHILADELPHIA, 2045 Hunting Park Ave. CHICAGO, 300 W. Pershing Road INDIANAPOLIS, 501 N. Holmes Ave.

New York - - - - 2070 Woolworth Bldg.
Boston - - - - - 49 Federal St.
Pittsburgh - - - - - 535 Fifth Ave.
St. Louis - - - - - - 705 Olive St.
Buffalo - - - - - - 745 Ellicott Square
Williamsport - - - 520 Second Nat'l Bank Bldg.
Huntington, W. Va. - Ratcom-Pritchard Bldg.
Cleveland - - - - - 529 Rockefeller Bldg.
Detroit - - - - - 4322 Woodward Ave.
Kansas City, Mo. - - 307 Elmhurst Bldg.
Denver - - - - - - - 520 Boston Bldg.
Atlanta - - - - - - 24 Marietta St.
Louisville, Ky. - - - - 231 Starks Bldg.
New Orleans - - - 504 Carondelet Bldg.
Birmingham, Ala. - 720 Brown-Marx Bldg.
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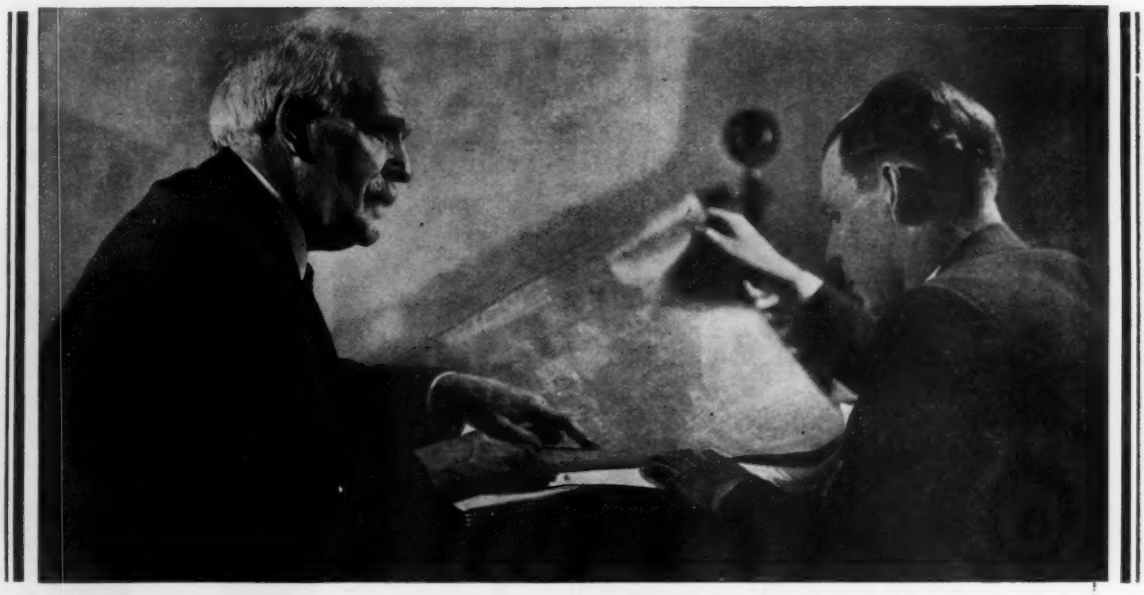
Whitney Central Co., Ltd., 618 S. Peters St.
Charlotte, N. C. - - - -
J. S. Cothrop, 900 Dime Bank Bldg.
Link-Belt Limited Toronto and Montreal

H. W. CALDWELL & SON CO.—Chicago, 1700 So. Western Ave.; New York, 2070 Woolworth Bldg.; Dallas, Texas, 848 Main St.

LINK-BELT MEESE & GOTTFRIED CO.—San Francisco, 19th and Harrison Sts.; Los Angeles, 600 E. Third St.; Seattle, 900 First Ave. S.; Portland, Ore., 67 Front St.

1596

LINK-BELT
SILENT CHAIN DRIVES



Why should we use ball bearings in our machines?

"Friction is the great thief of power. Ball bearings by reason of their design and construction reduce friction and increase power"

This was the answer our engineers gave to a manufacturer who asked the question above. At all bearing points there is loss of power due to friction. Power lost in transmission reduces production and increases costs. Science has produced no more efficient and practical friction reducing element of machine construction than the ball bearing. Ball bearings will pay for themselves many times over by preventing waste of power.

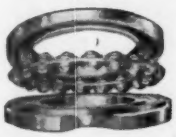
Our engineers will gladly help you solve problems of this nature. They are experienced in power transmission. They are equipped with essential data on all types of bearing application. Let them help you reduce overhead costs by minimizing friction.

We keep on hand at all times large stocks of standard sizes and styles in ball bearings. We fill requirements quickly. Strom ball bearings are machined with the care and precision of the finest watch parts, inspected by experts and repeatedly tested during manufacture. Let us help you. Write to us.

Double-acting thrust bearing, flat seats (grooved races) 2100-F Series

Single-acting thrust bearing, flat seats (grooved races) 1100-F Series

Single-acting, self-aligning thrust bearing 1100 Series



Single-acting, self-aligning thrust bearing, leveling washer. 1100-U Series

Double-acting, self-aligning thrust bearing, leveling washers 2100-U Series

Single-row deep-groove Standard type, radial bearing

Double-row, deep-groove Standard type, radial bearing

Angular contact bearing, combination radial and thrust

Double-row, maximum type, radial bearing

Single-row, maximum type, radial bearing

Strom BALL BEARINGS

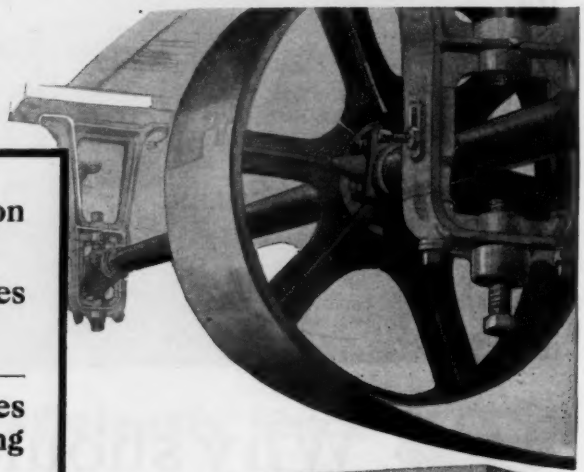
Manufactured by

U. S. BALL BEARING MFG. CO.

4544 Palmer Street

CHICAGO, U. S. A.

"It's a Cinch to Change to HYATT BEARINGS"



They go on quickly and stay on for the life of the plant.

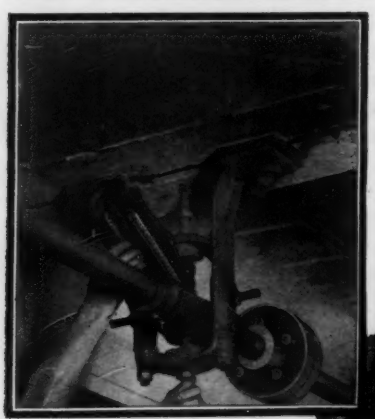
The fact that they're split makes them easy to install.

No need to hold up production—take off the old plain bearing boxes—put on the Hyatt roller bearing boxes.

You will immediately begin to save 15% of your total power costs and will only need to oil your line shaft bearings three or four times a year.

Save power, time, oil and worry.

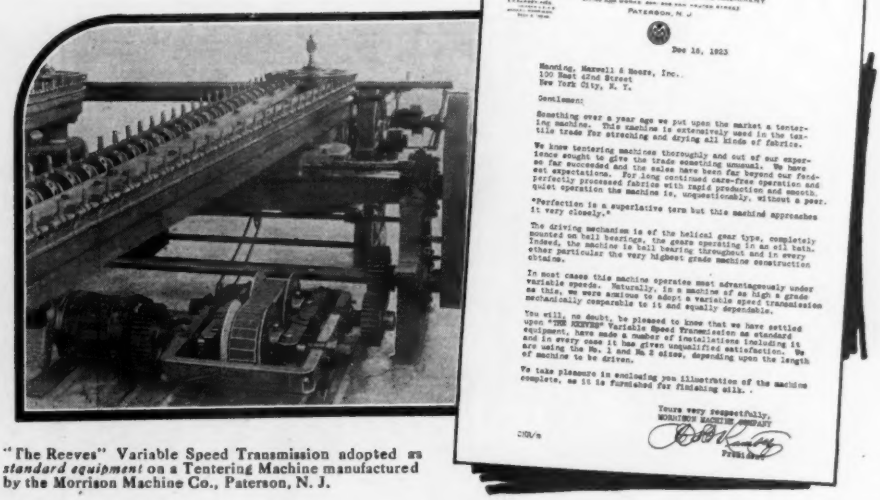
Get satisfactory service—install Hyatt line shaft bearings.



'Phone the nearest mill supply dealer

Hyatt Roller Bearing Company

Newark, N. J.



MORRISON MACHINE CO.
TEXTILE DYEING, FINISHING AND PRINTING MACHINERY
PATERSON, N. J.

Dec 18, 1923

Manning, Maxwell & Moore, Inc.
100 East 42nd Street
New York City, N. Y.

Gentlemen:

Something over a year ago we put upon the market a tentering machine. This machine is extensively used in the textile trade for stretching and drying all kinds of fabrics.

We know tentering machines thoroughly and out of our experience sought to give the trade something unusual. We have so far succeeded and the sales have been far beyond our fondest expectations. For long continued care-free operation and perfectly processed fabrics with rapid production and smooth, quiet operation the machine is, unquestionably, without a peer.

"Perfection is a superlative term but this machine approaches it very closely."

The driving mechanism is of the helical gear type, completely mounted on ball bearings, the gears operating in an oil bath. Indeed, the machine is ball bearing throughout and in every other particular the very highest grade machine construction obtains.

In most cases this machine operates most advantageously under variable speeds. Naturally, in a machine of so high a grade as this, we were anxious to adopt a variable speed transmission mechanically comparable to it and equally dependable.

You will, no doubt, be pleased to know that we have settled upon "THE REEVES" Variable Speed Transmission as standard equipment, have made a number of installations including it and in every case it has given unqualified satisfaction. We are using the No. 1 and No. 2 sizes, depending upon the length of machine to be driven.

We take pleasure in enclosing you illustration of the machine complete, as it is furnished for finishing silk.

Yours very respectfully,
MORRISON MACHINE COMPANY
By [signature]
President

"The Reeves" Variable Speed Transmission adopted as *standard equipment* on a Tentering Machine manufactured by the Morrison Machine Co., Paterson, N. J.

ANOTHER manufacturer of textile machinery has adopted "The Reeves" Variable Speed Transmission as *standard equipment*—further evidence of REEVES superiority and dependability in accurate speed regulation.

For over 28 years, this efficient, durable speed control device has been the recognized leader wherever variable speeds are necessary to production efficiency—in plants of all kinds, large and small, throughout the world.

"The Reeves" complete ball bearing Transmission is frictionless, noiseless, dependable, economical and durable. The entire working mechanism simply floats on balls without friction or vibration. Every bearing is self-aligning, dust proof and oil-tight, and requires oiling only at long intervals.

Undoubtedly, "The Reeves" Transmission can fill an important need in your plant. It is the ideal control for Tenter Frames, Dryers, Washing Machines, Singers, Mangles, Printing Machines, etc.

Write for bulletin C-2055—it tells how "The Reeves" Transmission with the Automatic Control eliminates the time and labor lost in transporting cloth from one machine to another.

"The Reeves"
VARIABLE SPEED TRANSMISSION

Over 95% of the mechanical variable speed control devices in the world's industrial plants are "The Reeves" Variable Speed Transmission.

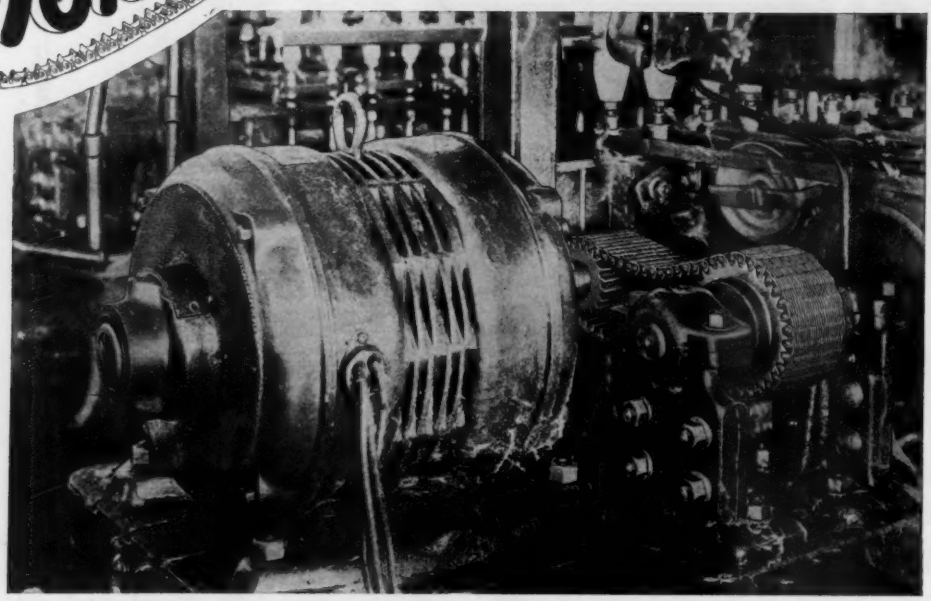
REEVES PULLEY COMPANY, COLUMBUS, INDIANA

Eastern Representatives:
MANNING, MAXWELL & MOORE, INC.,

100 East 42nd St.
New York City

99 Chauncy Street
Boston

MORSE SILENT CHAIN DRIVES



Morse Chain Driving Spinning Frames.

Short center chain drives Save valuable floor space

Morse Silent Chain Drives transmit power with 98.6% effiicency, **even over very short center distances.**

When planning equipment for your present plant or for new buildings, Morse short center drives will save valuable floor space, often enabling you to make present floor space take care of additions, or to greatly reduce the floor space necessary in new buildings.

With construction costs so prohibitive, Morse Silent Chain Drives are therefore a means of saving thousands of dollars when planning new equipment and new buildings.

Let Morse Engineers show you how Morse Silent Chain Drives over short center distances will conserve your valuable floor space.

MORSE CHAIN CO., ITHACA, N. Y.

There is a Morse Engineer near you

ATLANTA, GA...702 Candler Bldg., Earl F. Scott & Co.
BALTIMORE, MD.....1402 Lexington Bldg.
BOSTON, MASS.....141 Milk Street
CHARLOTTE, N. C.....404 Commercial Bank Bldg.
CHICAGO, ILL.....Room 803, 112 West Adams St.
CLEVELAND, OHIO.....421 Engineers Bldg.
DENVER, COLO.....1761 Wazee St., R. M. Parsons
DETROIT, MICH.....7601 Central Avenue
KANSAS CITY, MO.....Finance Bldg., Morse Eng. Co.
NEW YORK CITY.....Room 1871, 50 Church St.
MINNEAPOLIS, MINN. 413 Third Street, S., Strong-Scott Mfg. Co.
MONTREAL, QUE., CAN. St. Nicholas Bldg., Jones & Glassco, Reg'd
PHILADELPHIA, PA.....812 Franklin Trust Bldg.
PITTSBURGH, PA.....Westinghouse Bldg.
SAN FRANCISCO, CAL.....Monadnock Bldg.
ST. LOUIS, MO.....Chemical Bldg., Morse Eng. Co.
TORONTO, ONT., CAN. Bank of Hamilton Bldg., Jones & Glassco, Reg'd
WINNIPEG, MAN., CAN. Dufferin Street, Strong-Scott Mfg. Co.

20-75-30

They Are Just As Valuable In Present Frames

You need not wait until you order new spinning and twister frames to cash in on the economy and durability of Hyatt roller bearings.

The Hyatt replacement box makes it very easy to modernize your present equipment by replacing the old style wasteful plain bearings with economical power saving Hyatt bearings.

Tests under actual operating conditions show that Hyatt bearings save more than ½ H.P. per frame —this saving alone will pay for the bearings in a very short time and they will continue to pay dividends throughout the life of the frames.

The oil-tight housing of Hyatt bearings retains the oil, therefore they need oiling only 3 or 4 times a year.

You can secure all advantages of Hyatt bearings on any make of frame now. Write us for complete information.

Hyatt Roller Bearing Company

Newark Detroit Chicago San Francisco

Worcester Milwaukee Huntington
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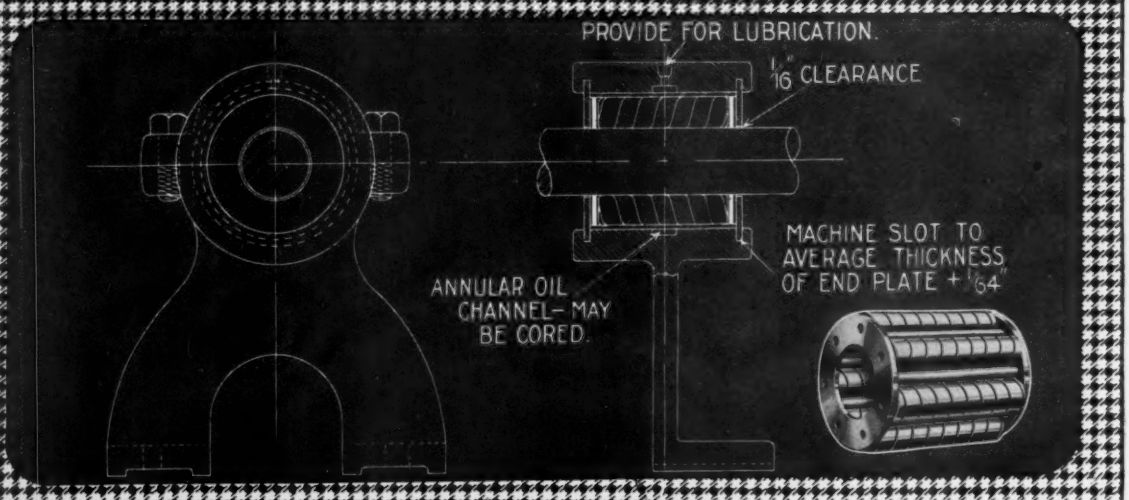
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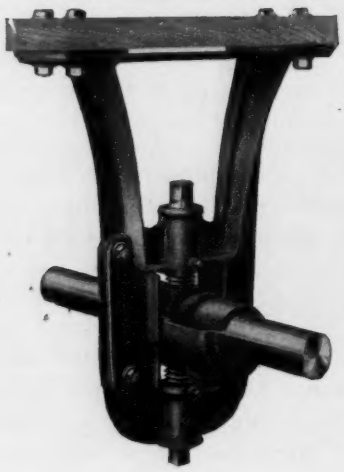

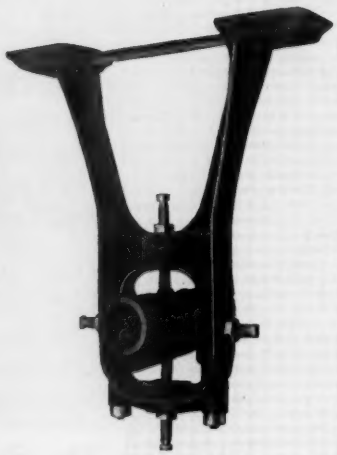

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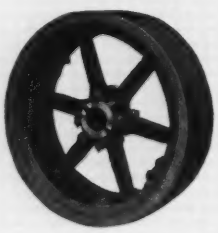

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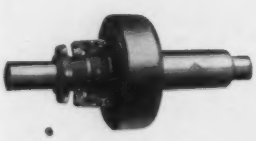

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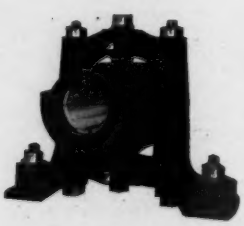

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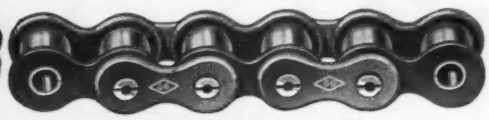

ROLLER CHAIN NO. 66. Pitch ½"; width ⅛". Single, will transmit 3 H.P. at 1200 to 1800 R.P.M. Double, will transmit 5 H.P. at 1200 to 1800 R.P.M.

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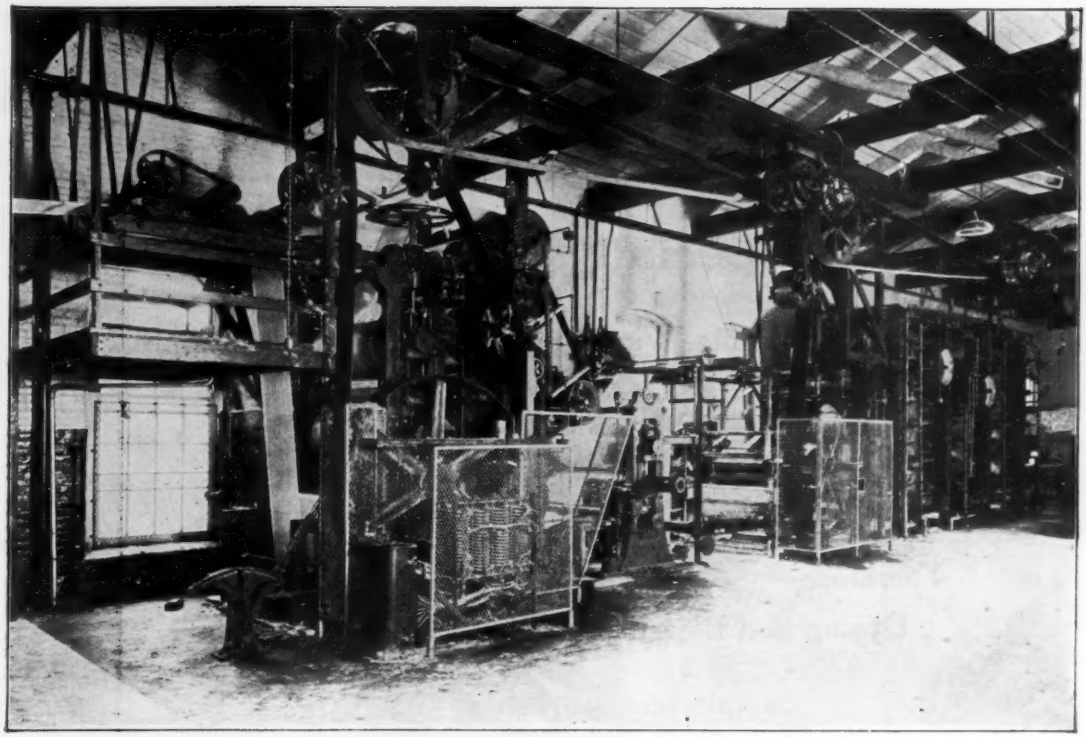

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With the Publishers—

Build a Business Highway to Your Factory Door

While driving along a suburban road recently our attention was attracted to a large quantity of granite fragments by the roadside, brought there for road building purposes. Passing vehicles had cut into the edge of the pile and scattered loose pieces of the stone along the roadway for a considerable distance, and these loose pieces continued to turn and slip as the wheels of our car struck them. They were unstable. They didn't stay put. Therefore, in that form, they would make a poor roadway.

But drive over that same road today and you will find an excellent hard surfaced road, smooth, firm, and capable of supporting any load that may be put upon it. It's the same granite fragments, but they have been suitably arranged and are now held in place by an admixture of sand and cement to form a perfect and permanent road surface called "concrete." Over such a road you may roll along in your big car at sixty miles an hour, and ride so easily, so smoothly, that your mental estimate would place the speed at twenty were not the speedometer on the dash constantly correcting you.

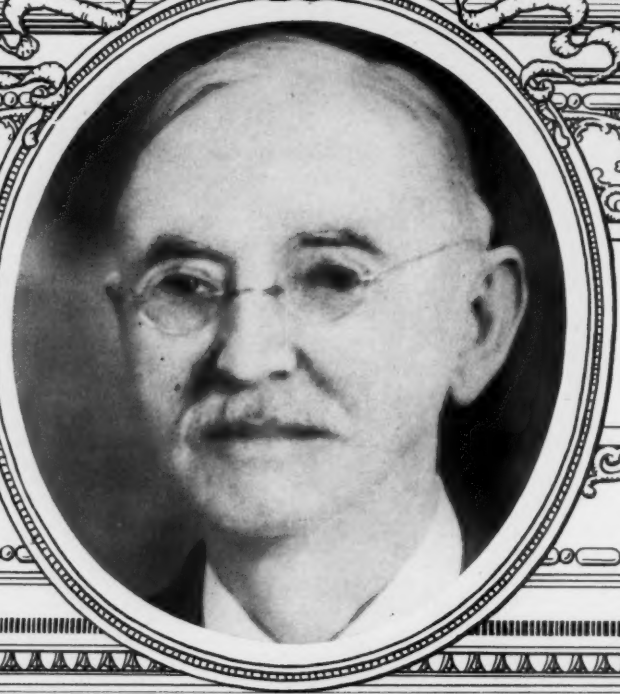
There is a distinct analogy between that road and your business.

You are making a product applicable in the textile manufacturing field. You believe it to be a good product. You spend a large portion of your waking hours studying and experimenting in your efforts to make it a still better product.

Should someone question your statements about that product you would advance fact after fact, in your business correspondence or otherwise, to prove your contentions. These facts would be "hard facts"; to you they would seem to be incontrovertible facts; but to the prospective customer, whose thoughts are on his own business, and who, unlike you, has not spent days and weeks in the study of your particular product, they would appear to be disjointed fragments of an argument. Your prospect's mind is not attuned, through long practice, to the nuances of the proposition, and although he might recognize for the moment many of the "hard facts" you present, they would, like the loose fragments of rock on the road, while sound enough in themselves, seem to him shifting and unstable. They would not "stay put."

Now take these same facts and mix with them, in proper proportions, the sand of graphic presentation and the cement of suitable business journal circulation. They will then reach your prospects month after month and will be read while those prospects are in their most receptive mood—when they want to read. In this way your practical statements will soon become familiar and commonly accepted truths. Furthermore, they will become so united in the minds of regular readers that each fact will aid in supporting its neighbors, thus causing their continuity to endure under the strain of severe or critical investigation. Finally, the combination will present a smooth, easily traveled business roadway leading to your factory door, over which the prospective customer may travel with the most comfort and the least expenditure of energy.

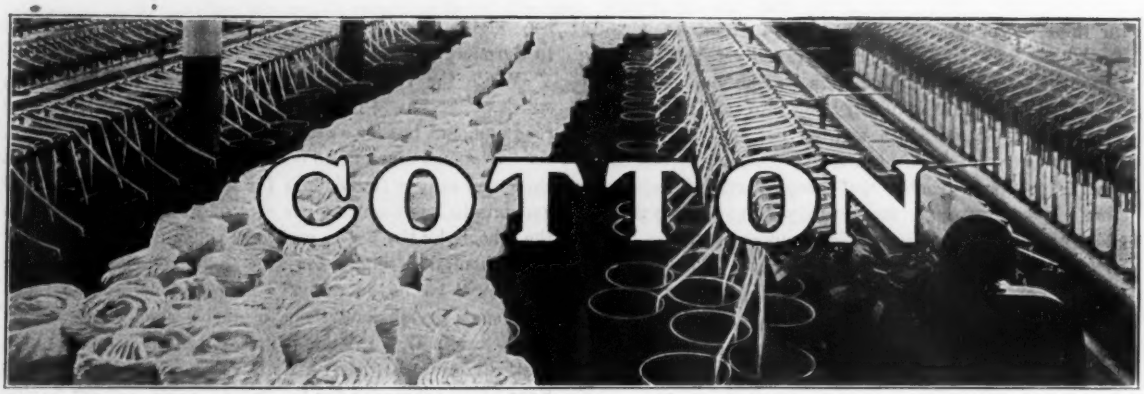
AMONG COTTON'S READERS



C. S. Wilkinson, Agent,
Dwight Manufacturing Company,
Alabama City, Alabama.

"I have been a subscriber to COTTON for years and find it interesting, as the magazine tells what the other fellow is doing, which gives me a chance to compare notes."

C. S. Wilkinson



February, Nineteen-Twenty-Four

Too Much Money.

It seems curious that the most difficult financial problems which the Federal Government has faced have not had to do with taking care of deficits and meeting obligations but with the getting rid of surpluses and the holding of inflow to the Treasury within the range of disbursements. At several times conditions growing out of this state of affairs have caused serious crises.

This singular phenomenon owes its cause perhaps to the wizardry exercised at the beginning of the government by Alexander Hamilton, the first Secretary of the Treasury. Hamilton believed that governments as well as individuals should pay their debts and always be in position to meet any just demand upon them. He believed, moreover, that government should be strong in other ways and that this could be achieved only by centralization. He knew that the everyday aphorism, that power goes with control of the purse strings, holds in government as well as elsewhere.

So he started out the Federal Government on policies which assured it of ample revenues and inviolable credit. These policies were very good, as shown, among others, by the fact that they have been adhered to on the whole to the present day.

But these policies frequently have resulted in too much revenue. This is due primarily to the fact that considerations other than the getting of money with which to conduct its operations have dominated many of the Government's revenues-raising measures. The tariff, the income tax and many of the miscellaneous taxes are imposed for funds-raising purpose in only a secondary sense. These measures often have brought into the Treasury more money than was needed or that the Government should possess. This has abetted waste and the elaboration of governmental activity. Once or twice even these could not be made to absorb the excess, as when the Federal Government got rid of a dangerous surplus by transferring funds directly to the States.

Because, as stated, the procuring of funds is only a secondary consideration in the levying of many taxes, it has always been difficult for the Government to get rid of excess revenues by the commonsense method of cutting taxes. For a long time the cutting of taxes meant the withdrawing of some measure of tariff protection from industries thus favored, with the result that strong business interests led in protesting against the use of that resource. Now, the situation is in great part reversed. The cutting of Federal taxes in any great amount means now the reduction of tolls levied more or less directly on business interests—and levied in great measure for purposes other than to get needed funds with which to run the Government. Therefore, business interests want tax reduction, and those who used to demand it day in and day out now really don't want it. These latter would rather gouge the rich, or seem to, via the income tax, than to keep the Government from raising more money than it needs or can use intelligently or safely.

Such seems to be the "psychology" of the financial problem now facing the Government and being wrestled with by Congress.

The Government is raising from four to five hundred million dollars a year above its needs, even on the present basis of elaborated activity and exorbitant waste. This accumulating surplus transfers from business a great volume of funds for idleness in the Treasury. It is a standing temptation to those who would add to present waste of funds on "political pork" and harmful expenditures on governmental meddling. A governmental surplus can be even a more dangerous thing than a deficit.

The commonsense and honest way to get rid of it is to cut revenues by reducing taxes. But to reduce revenues commensurably calls for cutting the income taxes. To cut the income taxes intelligently means cutting them all along the line, as Secretary Mellon proposes, the higher as well as the lower ones. And this would appear to be reducing the burden now imposed on the rich, which is one of the many strange delusions which now complicate public affairs; for the rich have no difficulty in escaping income taxes, either by passing them on to the general public or by evading them altogether.

But because of this factor many of the very persons—the reformers, the "progressives," the spokesmen for "the people"—actually would block genuine tax reduction and the annihilation of the dangerous surplus of funds in the Federal Treasury.

They would get rid of the surplus in quick order by adding to appropriations, and in such way as not only to prevent tax reduction now but as would make it impossible for the future even if higher taxes than at present were not made necessary.

If the higher brackets of the income tax schedules really operated to "soak" the rich there might be some excuse

for their continuance as at present. In truth they really "soak" the poor. For every dollar really taken from the rich by them, a thousand dollars probably is driven out of legitimate trade and industry and into tax-free channels. For every dollar of which wealthy persons really are deprived on account of them, a dollar probably is tacked on for the cost and trouble that people and interests, who seem to pay these taxes but actually do not, are put to in adding the toll to interest charges and prices.

The public evidently is not so stupid as many of the politicians in late years have been led firmly to believe. Not in years has the public made such a demand for intelligent action from Congress as has gone forth in recent months with regard to Federal finances and taxation. Whether Congress will yield to it is yet to be determined.

Save the Schools from the Bureaucrats.

If the discussion of taxes and bonuses and the farm situation and the railroads permits Congress to get around to it, one of the most far-reaching of measures now urged upon the Federal Government will be passed upon during the next few months. And unless more pronounced opposition than is now apparent develops the measure very probably will be enacted. Once enacted it will be virtually beyond recall.

The measure is known as the Sterling-Towner or the National Education Bill which has been before Congress for several years. This bill proposes to establish the beginning of a "national" system of education, and, if passed, it will constitute the first step towards placing control of the public schools, still happily in the hands of the local communities and the States, in a Washington bureau. And for this gigantic concession to Federal bureaucracy it is planned to deaden whatever sense of local pride and freedom left in the country with "gifts" of money from the national treasury—money which comes from the pockets of the very people to whom it will be "given."

This bill would set up a Federal Department of Education and provide it with, at the start, an annual appropriation of $100,000,000 for distribution on "fifty-fifty" terms among the States. That is, the States would have to provide equal sums specifically for the various educational purposes aimed at in the bill. These are direct attacks on illiteracy, the "Americanization" of immigrants, the training of teachers as well as the general betterment of the schools. While the bill grandiloquently declares that all control of the schools shall remain in the hands of local and State authorities, it fixes terms which every State must meet and carry out in order to secure the aid provided. And it sets up a powerful administrative establishment in Washington whose business it will be to see that this and whatever else some future Congress may require is done. If Congress can attach any conditions to the distribution of such funds, it may say, for example, that they shall go only to States which operate "mixed" schools, or use certain textbooks, or certain teachers, or anything else, for that matter. It will give the bureaucrats and politicians in Washington a propaganda resource which may enable them to make the country think whatever they believe it should think regarding any subject on the lists. This happened in Germany, whose schools and everything else have long been highly centralized—and with results highly calamitous to Germany and the world.

While the funds, $100,000,000 a year to begin with, which Congress will provide for the schools, seem large they really amount to only a scanty mess of pottage. Distributed, the initial sum amounts to only a few cents for every school child and only a few dollars for every teacher. The total amounts to less than five per cent of what is now spent on the schools by the States and local communities. And it is the grimmest of jokes for anyone to contend that these funds will be "given away." At best they will be taken from some persons and given to others, which in great part is a delusion. Even if this is true, it can be depended upon that, for example, the rich East isn't going to provide millions of school money for the "poor" South without having a lot to say about how that money is used.

"At present the people of the country are asleep on the subject and need to be aroused," says Bishop Warren A. Candler. "They do not perceive the purpose of the bill nor apprehend the wretched consequences of the measure if it were adopted."

A committee of business men which made an investigation of the proposal a year or two ago decided positively against it. "Federal participation in education means a revolutionary change in the conduct of our public schools," said this committee in its report to the United States Chamber of Commerce, "for it is the beginning of Federal control. This is the inevitable consequence of appropriations of Federal money for public schools."

"The bill is quite a long step in the Prussianizing of American education," says President Hadley of Yale University. Many of the most outstanding educators in the country oppose it.

The business world, which has all too good reason to know the effect of putting large power in the hands of petty bureaucrats and meddling politicians in Washington, should lead the way in showing up the fallacies and dangers inhering to this proposed venture into the realms of waste and tyranny.

Andrew W. Mellon.

When the late President Harding assembled his cabinet in March, 1921, scarcely a person in the country then would have picked the man who has become the outstanding figure in the group. In truth, most prophets believed that the reverse of what has taken place would occur.

For here was a comparatively unknown man who had never been heard of in active politics, a man who was believed popularly to be grasping, domineering, greedy, covert, put into what has become, next to the Presidency, the probably most responsible station in the Government. Moreover, the man named Secretary of the Treasury was one of the half-dozen richest men in the country if not in the world, a man who, by origin and training, was expected to lack ability if even the will to see public affairs from other than the standpoint of giant and tyranically disposed private interests. Added to these marks that apparently were against him, there were others standing for utter lack of speaking ability, hand-shaking facility and skill in the exercise of any of those arts which commonly are believed necessary to successful maneuvering in public life.

And yet without making conscious effort, by word or

manner, to offset that impression, Andrew W. Mellon has come to be accepted generally if not popularly as virtually its very opposite.

Many people of course do not share his conservative views as to government, his administration of the government's finances no doubt has lacked complete perfection. But it would be hard to find anyone who is in position to know and has ability to make honest and just estimates of men who will say that Mellon has not been, from his viewpoint, fair, honest and exceptionally able—probably the ablest Secretary of the Treasury since Alexander Hamilton. That he has not been influenced even unconsciously by his vast personal interests, or by any personal ambition—beyond that of doing the job in hand as well as possible—is evident even to those who differ with him as to policies.

And why has this one big figure at Washington ridden safely all the big billows of threat which circumstance alone arrayed in his pathway?

This probably is because he has been himself. And he has been himself largely because, so far as can be discerned, he is without political ambition, even, it would seem, without ambition for the attainment of what might be called "popular popularity." Therefore, he has been candid, straightforward, outspoken and modest in all of his actions. That, in this case—and in truth an exceptional one—the country has responded, lends assurance for the continuance of the republic.

On the Frequency of Textile Shows.

Prior to and during the last textile machinery show at Boston there was much discussion among exhibitors and prospective exhibitors as to whether such exhibits were being held too frequently for the best interests of the industry as a whole. It was generally conceded that the alternation of exhibits between the northern and southern sections, or, specifically, between Boston and Greenville, was advantageous, but the frequency of those alternations was the point of variance.

In an effort to indicate the trend of these opinions, COTTON took a poll of the principal supply and equipment manufacturers who had exhibited at one or more of the last four shows. A total of 96 replies were received and they tabulate as follows:

Alternating annually as at present	20
Alternating, with two years between shows	55
Alternating, with three years between shows	2
Alternating, with four years between shows	12
Without preference	7

Perhaps some extracts from letters received will indicate the principal reasons for the attitude of these groups. One of the manufacturers who was without preference said it was their policy to exhibit at shows however frequent they may be held. He continued:

"The question of whether they should be held each year is something to be decided on by the people who manage the shows and check up the attendance. If these competent men decide that they can get sufficient patronage with a show each year, we will trust their judgment and exhibit with them."

The general trend of opinion of the 55 who wish two-year alternations is fairly expressed by a machinery maker who points out that, "It is rare that any firm has made a development in any one machine or group of machines, of sufficient importance, so it would call for an exhibit of the article in a textile show oftener than once in two years . . ."

"The expense to the manufacturer, breaking up his factory organization by having officials and other workmen absent from the factory every year, is a serious handicap to the machine builder."

Of the 12 who favor four-year alternations, one letter is selected that largely expresses the sentiments expressed by the others. Its writer says:

"For a long time I have felt—and expressed the feeling—that these exhibitions come too frequently. They come too frequently for the exhibitors, not only on account of the expense entailed, but because as an actual fact in the intervals between exhibitions as now held, there can be little of novelty as between one exhibition and the next. Perhaps you have noticed that at the recent exhibition in Boston the usual large exhibitors had no space. This of itself was significant and I would welcome any pressure that might be brought to bear from any source (and it seems as if the textile papers have much influence in this regard) to bring about a program of an exhibition alternating in four-year periods.

"This would result in having a show every eight years in Boston and every eight years in Greenville. These intervals might allow opportunity for novelty, so they might be more worthwhile. In any event, speaking for myself, I would so regard them and would be more enthusiastic.

"Next to feeding himself, man's strongest urge has been to house and clothe himself. The textile industry has been refined down almost to the 'nth' degree. It is one of the oldest of the mechanical arts.

"My feeling about exhibitions is that there is not so much of novelty in design or refinement of machinery, as there is the effect upon the new and changing audience which it interests. This audience, while it is fairly constant, is not one which exhibitions serve as instructively as we think—so it seems to me. The additions to our audience are coming pretty largely now from textile or technical schools where all the apparatus or nearly all of it, is available to the individual for study and manipulation. It is because of this that I feel that textile exhibitions are coming too frequently."

In closing, we wish to present the following letter from Frederick H. Bishop, of the Universal Winding Company, which was written in response to one of the questionnaires. Mr. Bishop's long and close association with the Boston show in an official capacity makes his analysis of especial interest, although we are not in full agreement with all of his statements. He says:

"Your questions are asked in such a form that they cannot be answered 'yes' or 'no' by anyone who has made a study of exhibitions or who has had any experience in regard to the functioning of the different exhibitions from time to time. You make a distinction between the Boston and Greenville shows; the answers you would receive, therefore, would be neither conclusive nor satisfactory. Will you bear with me for giving a little analysis to the relation of different textile shows?

"*Greenville.* These exhibitions have been, and naturally will for some time continue to be, specialized along the line of the cotton industry, which is logical and advantage-

ous. Owing to the limited space in the exhibition building it would not be possible to function in the placing of a composite show in that place. Even in catering to the cotton line they will probably be obliged to put up temporary structures for the exhibition next Fall. Therefore, exhibitions in Greenville should be made when the managers believe they can secure a full complement of leading manufacturers in the *cotton* industry, it being a sectional, and to a great extent, local, exhibition, devoted specifically to one particular branch of the textile industry.

"Boston. This textile exposition having the advantage of much greater floor space and a location where all the different lines of textile manufacture are well represented is in a position to cater to all of them and therefore functions best when it receives the support of not only cotton but the worsted, woolen, silk, knit goods and all supplementary lines of manufacture. In the last exhibition held this (last) Fall, as you are aware, there was a relatively smaller proportion of the space occupied by machinery intended especially for the handling and manufacture of cotton, and yet with the spaces fully occupied by a wide range of machinery the show was financially successful and educational on a variety of lines.

"Philadelphia. Each year the knitgoods industry gives an exhibition in Philadelphia that is greater in extent than the southern exhibition. This exhibition covers a wide range of the textile industry in the handling of material, cotton, worsted, woolen, silk and artificial silk, with accessory machines related to the knitgoods industry. As you know, this exhibition occupies more than double the amount of floor space in the exhibition building in Greenville and is held every year in the same space which, as you are aware, is not favorably located for easy access in comparison with either Greenville or Boston. Are we not warranted in assuming that if the exhibitors did not consider they were receiving a *quid pro quo* they would not continue year after year to occupy space, some of them having large exhibits which involve the expenditure of considerable money?

"Now, in reference to the exhibition, the question in the opinion of the writer does not rest so much in the frequency of the exhibitions as in the competition between the large textile machinery manufacturers who, vieing with each other, appropriate such large space in each exhibition as to make the expense of exhibiting over-balance, in their opinion, the benefit they would receive by putting the exhibitions further apart. Candidly, so far as the principle is concerned, there is no comparison to be drawn between the three different exhibitions and if you were to take a comparison between Philadelphia and Greenville you would cover many exhibitors that would belong in each show and more than you would to compare between Greenville and Boston. It is, therefore, not so much a question of time as of the individual judgment of the exhibitors as to when, where and why they put in whatever they have to show that would be of advantage.

"The exhibitions being under the control of societies should be arranged for and planned carefully by the stockholders or members of the associations. They are associations functioning to make successful exhibitions and to at least clear expenses. The question of the individual members or those who might desire to exhibit should then rest with each and there should not be criticisms of their actions if they wish to remain out of the exhibit. They should know their own business best and whether they want to exhibit in one place or another.

"Without being able to reply specifically to your form letter I would say that, personally, I am not averse to a three-year period between the exhibitions here in Boston rather than two years, should it appear to suit a larger proportion of the membership and to give more time for development of new and important improvements in general than the shorter period. This is merely a personal viewpoint, as the Universal Winding Co., having had many years' experience along this line of 'education by the eye' are fully committed to all textile exhibitions that are properly handled, having exhibited in Philadelphia and Greenville last year (1922), in Boston this year (1923) and having made arrangements to exhibit in Philadelphia and Greenville next year (1924). You will see, therefore, that the question of time between exhibitions is not material with us, because we know their value and embrace every opportunity to show our machines to the textile industry."

INTANGIBLES IN MANUFACTURING

A Series by

Frederick H. McDonald.

Keeping in the Main Road.

There seems to be a kind of an allure in the unknown that is always tempting us to try something new—a thing that can be mighty expensive in plant production.

There often develops a tendency to go into side-lines of manufacture.

Which is all right if you know what you are doing.

But many a side line is carried at a loss, cutting into the profit in the original or principal line.

Occasionally a side-line develops into a bigger business than the original main product. It happens seldom—and only when the side-line is an assured money maker.

Sometimes a wonderful idea is conceived of making a business self-contained by manufacturing or controlling all the contributing lines.

The idea is a noble one—but its casual or incomplete expression will be costly.

A powerfully good organization, with lots of brain and capital behind it, is necessary to show better results in the long run than the original one-thing-all-the-year-'round old stand-by specialty!

Air Conditioning Practice in Cotton Mills

By Albert W. Thompson
Vice-President Parks-Cramer Company

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THE recommendations offered here are consistent with opinion collected from practical manufacturers and textile experts. They are subject to such modifications as common sense and experience would naturally suggest when dealing with special conditions and problems. We have sought to support them by discussing the mechanical processes and condition of the material in order to explain the part played by atmospheric moisture.

Cotton in process of manufacture must rely wholly upon the atmosphere as the source of its moisture content, which is so essential to its strength and to successful manipulation. Hence the importance of proper atmospheric conditions.

What atmospheric conditions are best for cotton manufacturing?

What atmospheric conditions produce good processing, uniformly good quality throughout, minimum labor and maximum of production—coupled with minimum waste of raw or partly finished material?

How may we produce in the final product that condition of regain which ensures full value to the buyer and at the same time safeguards the manufacturer from unnecessary consumption of raw material?

For the present we are concerned only with the conditions which bring about the best results regardless of the means employed. Later we shall describe devices.

Preventing Fiber Breakage. All initially-defective fiber and foreign matter such as leaf and seed extracted during the process of manufacture represents a necessary rejection of inferior material. Such rejected matter is not waste in the true sense of the word.

On the other hand, all originally-sound fiber broken unnecessarily during processing must be rejected also and become mingled with and indistinguishable from the originally-defective fiber. Good fiber thus lost is a waste because it is preventable. To the extent that we do prevent breakage of sound fiber during processing, we effect an important economy, since all raw material so saved will appear in the finished product.

Most so-called waste produced when ends break down on cards or other machines contains good fiber and goes directly back into process. This waste represents loss of production, loss of labor, and a corresponding increase in cost of production, but not a loss of raw material. The principal loss of raw material in manufacture is that due to the breakage of sound fiber to which we have just drawn attention. Therefore, in each department we should aim at an atmospheric condition which will produce such a moisture content in the material as will fit it to resist successfully the wear and tear of manufacture and facilitate processing. In some cases it may even be worth while to treat the material by special conditioning between two manufacturing processes to bring about a particularly desirable physical condition.

Importance of Final Regain. Nor must we fail to consider the regain of the finished product—the proper relation between dry-weight and moisture content when it is shipped. Negligence may result in enormous losses if, when finished goods are invoiced to the purchaser, the manufacturer unconsciously delivers a greater dry-weight of material than that to which the purchaser is fairly entitled.

The manufacturer should carefully consider what condition of regain is best in his particular product. He should then make every effort to secure it in his final processes by maintaining atmospheric conditions which assure it.

In most cases the regain realized in the product in actual practice is found to be appreciably less than Hartshorne's Tables indicate. Such discrepancies are undoubtedly due partly to a physical condition of the product which differs from that of yarn in the loose skein, upon which Hartshorne's Tables were based, and partly to the length of time required for the material to reach a condition of hygroscopic equilibrium with the atmosphere.

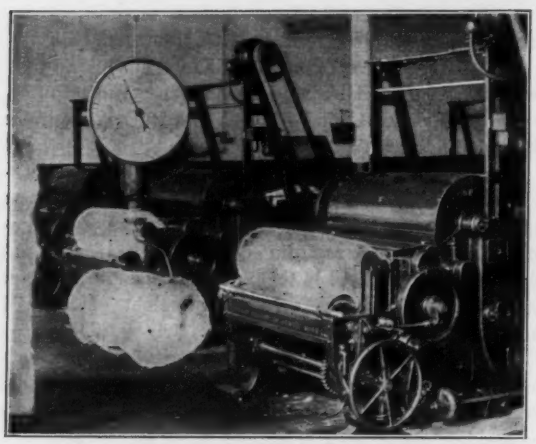
So—it is usually necessary to maintain humidities and temperatures which, when compared with the tables, would indicate regains of 8½ per cent or even higher, although the manufacturer may be satisfied with actual regains of less than 8½ per cent.

Unless pains are taken to maintain those conditions which will actually produce proper regain, a large annual excess in actual dry-weight of material is shipped for which no valuable consideration is received and which therefore represents a heavy annual loss.

Ample Regain Aids Processing. Fortunately, those atmospheric conditions which produce a moisture content favorable for the best manufacture tend also to produce a regain in the finished product which protects the manufacturer from the sale of an excessive dry-weight. It is possible to so determine the atmospheric conditions throughout the mill that while each process is conducted under favorable conditions, the material also progressively increases in moisture content, and finally attains a satisfactory condition in the finished product.

The conditions which we recommend are intended to represent minimum requirements for general practice. The manufacturer who fully appreciates the importance of humidity may safely commence with these, modifying them to suit his particular case if he finds that higher ranges result in visible improvements.

Opening and Picking. As taken from the bale, cotton usually contains more moisture than is desirable for thorough cleaning. In small mills it is aired by permitting it to lie in open bins for some hours before being fed to the opener picker. In large mills cotton taken directly from the bale is supplied to automatic feeders. These deliver it at a fairly constant rate, on conveyor belts, to a fan conveyor system, terminating at a "condenser" located in the opener picker room. From the condenser screen the cotton is automatically delivered into the hoppers of the feeders on the opener pickers. During this handling and transporting process the masses of fiber are opened and exposed to



Finisher Pickers—Showing Lap Weighing Scale.

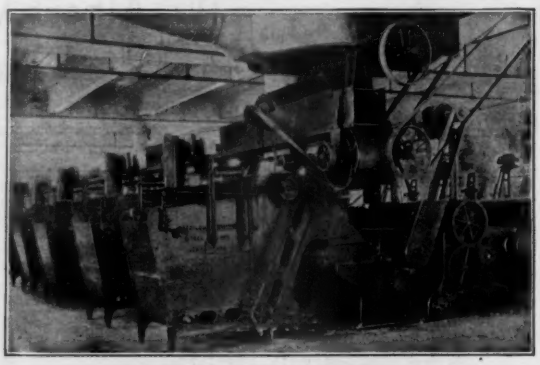
the air so thoroughly that the material gives up a considerable part of the moisture which it contained in the baled state.

The picking process, during which the cotton passes usually through three or more beaters, further separates the fiber masses from each other and extracts the major portion of leaf, motes, seeds and dirt. The "doubling" of four laps fed into the intermediate and finisher pickers, coupled with the automatic evening device in the finisher picker, results in a finisher picker lap of relatively even weight per unit of length, suitable for carding.

The moisture content during the picking process should be sufficient to avoid brittleness and injury during the beating process, but not sufficient to develop a clinging tendency which would interfere with the separation of the various impurities.

Moisture is Lost During Picking. Cotton in the bale contains a variable amount of moisture normally ranging from 8 per cent to 12 per cent regain, a portion of which is dried out during opening and picking. Because of aeration, the cotton often falls to a regain as low as 4 per cent in the finisher picker lap when there is no humidification in the picker room.

To condense the cotton on the picker cages the picker fans suck a large volume of air through the beater compartments which is discharged to the dust hole, thus causing a rapid air change in the picker room itself. The absolute humidity in the picker room is therefore approximately that of the outside air. Considerable frictional heat is developed inside the beater compartments and the picker room temperature, especially in winter, is higher than the outside temperature. The air to which the cotton is exposed is

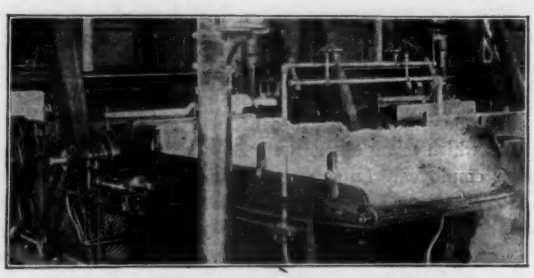


Courtesy Saco-Lowell Shops.
Morton Automatic Conveyor System for Feeding Cotton to Pickers.

therefore generally low in relative humidity. All of these circumstances combine to effect a relatively low moisture content of the cotton in the finisher picker lap.

In cold weather the regain may fall to as low as 4 per cent but even under these conditions the fiber will not be materially injured by the beating process. If the regain is between 4 and 5½ per cent, cotton will give up its impurities readily and these conditions are therefore generally considered favorable.

Humidification of picker rooms is sometimes advocated on the theory that the material can be better prepared for carding by producing a higher regain in the finisher lap, but because of rapid air change the humidifying capacity required for even moderate regains calls for a relatively large investment. It is ordinarily considered more advantageous and less expensive to commence the restoration of the moisture content after the picking process has been



Turbo Humidifiers Spraying Moisture directly on the Laps of a Finisher Picker. Widely used on Bleached or Dyed Stock.

completed and restore it progressively during succeeding processes.

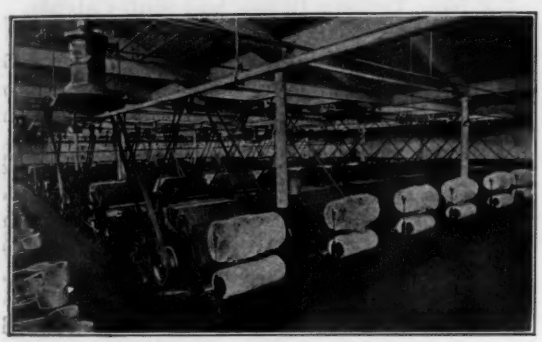
Special Treatment of Dyed or Bleached Cotton. In colored goods mills, cotton is sometimes dyed or bleached "in the raw." For high grade colored goods it is often put through a picking process and then bleached or dyed. In either case, cotton thus treated is first partially relieved of moisture by centrifugal extraction and then dried in stock-drying machines after which picking is necessary as a preparation for the carding.

After bleaching or dyeing, the condition of the fiber is in some respects radically different from that of raw cotton. The natural oil and wax have been largely removed. Unless the cotton is specially treated, picking and carding become difficult even under atmospheric conditions which would be favorable to gray cotton.

The introduction of a solution of Glaubers' salts into the bleached or dyed cotton renders it more workable by increasing its tendency to absorb and retain moisture. It is important that the solution should be uniformly distributed. The spray should be sufficiently heavy to be immediately deposited but fine enough to favor rapid absorption.

This is accomplished by mounting directly over the back aprons of the pickers special atomizers which continuously deposit a spray of the salt solution upon the picker laps. A special valve mechanism should be connected with the stop motion of the pickers so that the spray will cease whenever the machine stops. It is necessary to arrange the mixing tanks and the piping system to the atomizers with especial care to prevent precipitated salt in the system and in the atomizers themselves. Such apparatus is in wide use in some of the largest colored goods mills.

After such treatment, bleached or dyed cottons may be



Card Room of a Large Southern Mill.

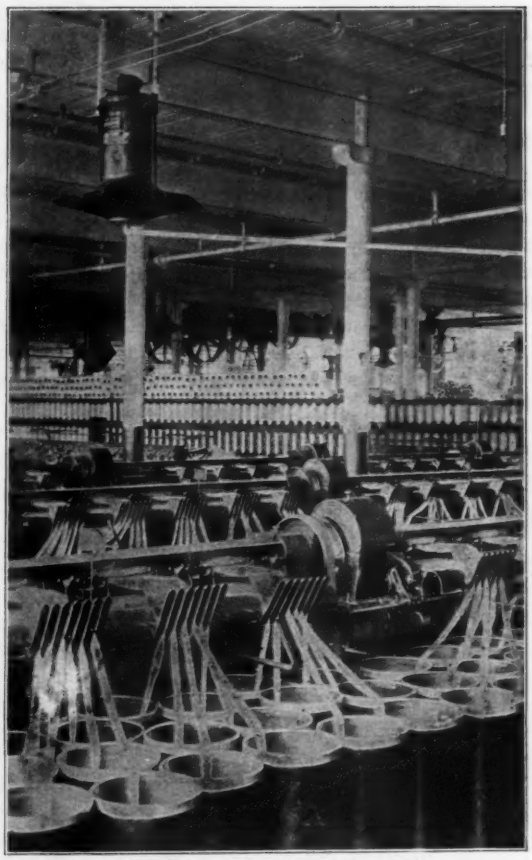
carded and spun under substantially the same conditions as gray.

Carding. The purpose of the carding process proper is to further separate and disentangle the confused masses of fiber; to remove the remaining impurities and defective fiber; to reassemble and deliver the cotton in a continuous strand or "sliver." At this stage, the moisture content of the cotton should be high enough to avoid the generation of static electricity and to avoid a brittle condition of the fiber which would result in breakage—but not so high as to produce a tendency for the fibers to hug and cling, so advantageous in later processes.

The lap is fully exposed during its relatively slow entry into the feed rolls of the card, and tends to take up a moisture content corresponding to the relative humidity in the card room. The most desirable humidity depends somewhat upon the length of staple and cleanness of the material. Study and experience indicate that moderate humidities of from 45 per cent to 55 per cent, at temperatures of around 70 to 75 degrees, are most beneficial in both carding and drawing.

In winter, and during the raw and windy days of early spring, serious difficulties develop because of static electricity unless the card room humidity is maintained at above 40 per cent.

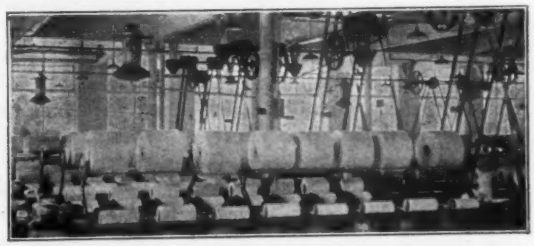
(Our recommendations apply only to conditions ascertained by means of reliable *psychrometers* or equivalent instruments. Practice will be effective only when carefully and consistently followed by intelligent observers.)



Drawing—Multi-Story Yarn Mill.

Drawing. In the drawing process, several card slivers are combined and drawn out into one, to effect a parallel arrangement of the fibers. It is customary to locate drawing frames in the immediate neighborhood of the cards, usually in the same room. Even when in a separate room, the humidity for drawing should be no lower than during carding. A higher humidity does no harm and is frequently practiced when manufacturing combed yarns.

Combing. The combing process follows carding and precedes drawing. It is used in the manufacture of high grade products such as sewing thread, extra fine yarns, high grade hosiery yarn, and some mechanical fabrics where cotton of extra long staple is necessary. Combing is a delicate quality operation which effects further cleaning and the removal of all fibers which are shorter than the desired minimum staple. The short fibers after removal are known



Combing—Fine Yarn Mill.

as "noils." The process requires a humidity and moisture content considerably higher than carding, not less than from 60 to 65 per cent relative humidity at 70 to 75 degrees F.

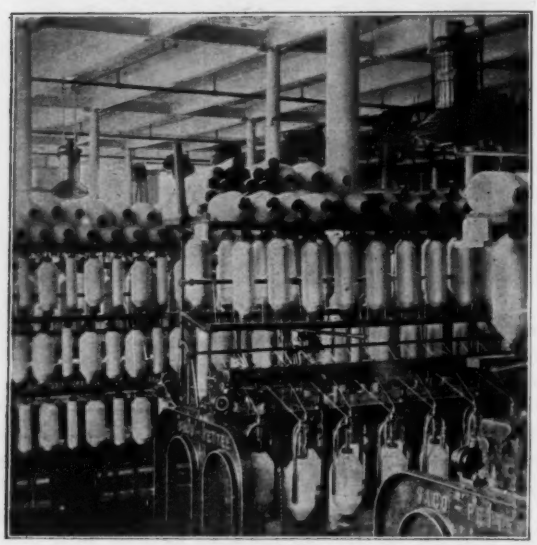
The slightest presence of static electricity is absolutely fatal and a supple condition of the fibers is essential.

Drawing is necessary after combing to secure doubling and evening of the combed sliver and prepare it for the subsequent roving process. When combing machines are used it is customary to locate drawing frames in their immediate neighborhood. They both operate satisfactorily under the same atmospheric conditions.

Roving. The roving operation draws out the relatively thick and heavy sliver which leaves the finisher drawing frame into a thin strand suitable for spinning with only one final draft.

The drafting of the sliver on the "slubber"—the first roving machine—results in a product so thin that to wind it, it is necessary for the first time to introduce twist to give it the requisite strength.

Two, three, and sometimes four roving processes succeed



Roving.

each other. The roving machines differ from each other only in the diminishing size of the bobbin and flyer as the product becomes finer and more even by repeated drafting and doubling.

Now the material must be in a condition such that the draft rolls can grip it firmly, that is will take the draft evenly and the fibers will cling just enough to assist the running in of the twist by the revolving flyer as the strand of roving leaves the draft rolls.

The presence of static electricity is especially dangerous here, so it is time to increase the humidity. Moreover, we should now approach the regain desired in the finished yarn.

Throughout the roving room, humidities should be increased as compared with carding so as to range from 50 to 60 per cent for best results.

Aside from quality the production factor is especially important here. If humidity falls too low roving takes twist less readily, static electricity begins to be evident, and frequent breakdowns occur, to prevent which it is necessary to increase the twist.

Increasing the twist on a roving frame calls for a change in the gearing. Since the speed of the flyers is constant this decreases the speed of the delivery rolls. Aside from interference to production by breakdowns, it is evident that a relatively high twist means a correspondingly low rate of production. Too high a twist also impairs quality since the twist impedes proper drafting in the next process—whether roving or spinning—and tends to cause uneven roving or yarn and consequent breakage.

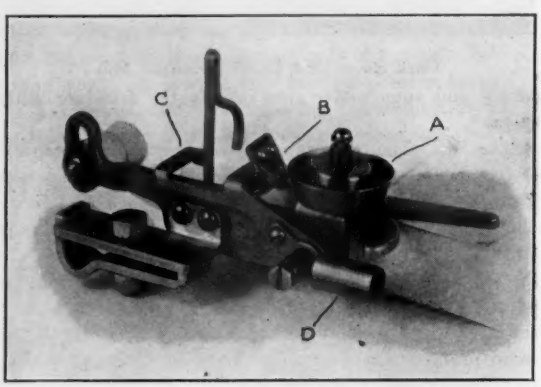
The importance of humidity in roving departments is not generally appreciated because roving machinery can be and often is operated in a relatively dry atmosphere by relying upon relatively high twists. In a room operated with apparent success under these conditions the actual losses in production and quality are not clearly apparent. It is only when the twist is reduced to the extent which a good atmosphere permits that we begin to appreciate the substantial gains which accrue from increased production and improved quality.

[This is the first of a series of articles on Air Conditioning Practice by Mr. Thompson. Another will appear next month.]

A New Tension Device and Slub Catcher.

A combination tension device and slub catcher, which is shown in the accompanying illustration, has been placed on the market by Eclipse Textile Devices, Inc., Elmira, N. Y.

This device, in addition to its combined purpose, is applicable for use on both spooler and winder, and, furthermore, may be used with either warp or filling wound yarn, it is pointed out. The device as illustrated is for use on the winder, the porcelain guide shown being used for that



application, while on the spooler a different type of guide is used. These guides are made interchangeable on the same device.

The tension on the device *A* is regulated by the weights shown. The yarn passes under this cone-shaped disc, then under the slub catcher *B*, going under the first tension arm thereafter and over the second arm *C* from which it goes to the guide, and onto the spool or bobbin. It will thus be seen that the two arms form a tension on the yarn, and the amount of this tension may be regulated for different yarn numbers by the turning of the screw seen in the counterweight *D*. It is pointed out that this device is automatically self-threading, the operator merely placing the thread against the finger that leads to the cone-shaped disc.

Compensation Insurance Ratings

BY DUNHILL MARSDON.

A problem frequently agitating the minds of mill managers is that of Compensation Insurance.

It is comparatively a new problem and somewhat complex and baffling in its solution.

Some mill executives are industriously studying it and are satisfactorily solving it. Others are seemingly lost in its mystery, and letting it take care of itself, and its reactions are not what they should like for them to be.

The following remarks are made with the hope that they will possibly be of benefit to some mill manager. They are submitted, not as an exhaustive study but simply to "start the wheels" in the minds of the proper people who are capable of giving it an exhaustive study.

A questionnaire relating to rates, companies, service, etc., in compensation insurance sent out a few months ago to a selected group of mills brought back fifty-six replies.

In the fifty-six replies there were twenty-two companies represented, ranging in groups represented by companies as follows: 13-8-7-7-4-4-3-2-1-1. Later figures, owing to changing companies, showed 15-12-6-6-4-2-1-1-1.

The groups represented by 15, 12 and 6 are three companies, one a mutual company, and two stock companies. The three ratings of these companies were tabulated for the 15, 12 and 6 factories, then added and averages taken. Company number (1) showed an average of 37.8%. In this group the lowest rate was 26% and the highest rate 65%. In group (2) the average rate was 39.5%; the lowest, 30%, and the highest, 59.3%. In group number (3) there were six showing an average rate of 36.6%.

Below is an illustration of the periods at which new rates will become effective in Georgia, if a mill began its insurance on March 1st, 1921:

Rating from March 1, 1921, to Sept. 1, 1921, effective Sept. 1, 1921.

Rating from March 1, 1921, to March 1, 1922, effective Sept. 1, 1922.

Rating from March 1, 1921, to March 1, 1923, effective Sept. 1, 1923.

Rating from March 1, 1921, to March 1, 1924, effective Sept. 1, 1924.

Rating from Sept. 1, 1921, to March 1, 1925, effective Sept. 1, 1925.

Rating from Sept. 1, 1922, to March 1, 1926, effective Sept. 1, 1926.

A study of this reveals the fact that a mill accumulates experience up to a 42 months' period, and after that period the next 12 months' experience is added and the first 12 months is dropped off. All experience is based on a 42 months' period. It will also be noted that a very good or a very bad experience during any one period of 12 months effects the rating during a 42 months' period. It will also be noticed that the period closes six months before the rate is effective. This happens so that experience can be collated.

The basic rates for compensation insurance are as follows: Alabama, 46; Georgia, 44; Louisiana, 62; Massachusetts, 83; New Hampshire, 48; New Jersey, 54; Oklahoma, 63; Rhode Island, 54; Tennessee, 53; Texas, 77; Virginia, 55. It will be observed that Georgia has lowest rate of the states quoted.

There are several things that I would like to call to your attention. They are practically true if not entirely so.

1. There are two factors that largely control your compensation rate:
   a. The physical condition of your plant.
   b. The moral risk.

By the physical condition is meant the general layout, accident hazards, etc. Those risks that seem to invite accidents. These can be overcome by rearrangement of machines, possibly, safety devices, etc.

As I understand it, each insurance company has its safety engineer inspect each plant and make a report on it both to the company and to the rate commission. Recommendations are also made to the plant manager as to the needed readjustments necessary for the rate to be affected by the physical condition.

After this report with recommendations has been filed it stands as an everlasting determining factor in the mill until these conditions are modified.

All men are mortal. All men have hobbies, and these hobbies are often extreme views whether they are views in the mental or material world.

Safety engineers can see thousands of hazards that the laymen can not see. They can see possible and probable hazards that do not exist and will never exist. They need the sane, sensible and admonitory advice and suggestions of the plant manager in making this inspection. It seems to me, if it is permissible, the plant manager should accompany the safety engineer on his inspection as both will be greatly benefited. Theory and practice nearly always work well together. After the safety engineer has left the plant and made his recommendation, it must be enacted to affect the physical rating. His recommendations may seem extreme, but they must not be ignored, and then expect a rate change.

The second factor we shall call the moral factor for want of a better name.

By this is meant the mental attitude of all of the people who handle people, or are handled. By this is meant indifference, carelessness, ignorance, taking chances, etc. They may be classified as non-mechanical causes, i.e., falls, handling materials, striking against objects, falling material, hand tools, etc.

The following suggestions may be of value in overcoming these factors:

1. Safety guards and appliances.
2. Safety organizations that really function.

The overseer must be a man of clear and concise judgment. He must enjoy the confidence and respect of his men. He must realize that the plant wants every employee to have every dollar of compensation that he is *justly* entitled to. He must be an active judge of equity and justice. He must keep an accurate record and report of every accident, major and minor. He must see that it is properly taken care of in the record and report. There must be no malingering. In many cases people either magnify their

injury, or are indifferent to it. Both attitudes are bad. The overseer is the key to the situation, and he, in a large measure, is the *key man who raises or lowers the rate.* A man with a scratch or cut may regard it as insignificant. Infection may be costly in many ways. A few minutes to have it sterilized and dressed would have made him able to return to work and relieved any hazard.

Again, this same person with a scratch or cut may be advised to stay out and not report until days have elapsed and medical bills accumulated with an unproportional cost to all concerned. This is used only for illustration.

The foreman or overseer is the man whose judgment is of value here.

The idea of getting something for nothing is a fallacy—we pay for what we get. This is a law as infallible as the course of the sun. It can be said in the reverse. We get what we pay for.

The idea that an accident does not cost anyone but the insurance company is entirely an error.

The insurance company or carrier is the only one that it does not cost.

The total accident cost or amount of money paid to employees, plus the overhead expense, plus the probable accident hazard regulates the compensative rate. The carrier then calls upon the plant to pay for this amount, and this in turn reduces the earnings of the plant. The earnings of the plant determine its success or failure, and may in turn affect the wages of the employees as a whole.

I recall one accident that raised the rate of one plant from about 37% or 40% to 65%.

The attitude of the Industrial Commission is that it costs only the insurance carrier, therefore, let them pay. For this reason ninety to ninety-five per cent of the cases carried before this commission are decided in favor of the claimant.

The insurance carriers are not philanthropists—yet. They are in business for two purposes: first, to make money, and, second, to serve the public, but the public must pay for the service.

There are four classes of claims that must be paid:

1. Medical services.
2. Permanent partial disability.
3. Permanent total disability.
4. Death.

The hiring policy can help solve the insurance rate by the proper hiring of help. The time has arrived when efficiency is a word that means more than it ever did. The overseers, or those who employ, must study carefully the fitness of the applicants for particular jobs. There are people with poor judgment, but good operatives, on work where automatization is a highly required characteristic and danger hazards are not inviting. There are people whose judgments are clear both for self and others. These people should be placed, if possible, where hazards are greatest.

It is a reasonable supposition, I think, that some hazards will exist. After all precautions have been taken, the human element will possibly make a mistake. And yet, I found a man who had been in the knitting business for 28 years who told me that he had not had an accident in his plant during his experience.

The *proper hiring* and *placing of people* can help in reducing accidents.

The work of the safety committees can be of value in: (1) Cooperating and believing in a safety policy; (2) in making safety inspections in a systematic and scientific way; (3) in recommending and putting into effect safety guards and appliances; (4) sometimes in a rearrangement of layout; (5) in studying accidents and trying to arrive at causes and how they may be overcome; (6) in educating their help into a strict and respectful observance of all rules and regulations; (7) in properly representing the plant and insurance carrier in all their efforts to reduce accidents.

The insurance company does not fix the rate. The rate is made by the insurance commission according to its rules and regulations and based upon the aggregate reports of the insurance companies according to the experiences and physical conditions of the industries.

These rules and regulations are rather arbitrary and unchanging.

I have indicated the reported attitude of the Industrial Commission relative to appeals for compensation.

If this exposition has been logical, it must be deduced that the individual physical condition and experience of plants and the summation of all plants affect rates.

What can be done to arrive at a reasonable and just rate?

If I can be pardoned for repeating, I will summarize:

1. The Insurance carrier which renders the greatest service to the plant in advice and counsel must be obeyed in its advice and counsel.
2. Proper hiring and placing.
3. A standard safety organization.
4. A proper study of accidents and removal of causes.
5. Education on safety lines.
6. Cooperation, or in the language of "The Three Musketeers," "One for all and all for one."
7. Proper respect by all for rules and regulations.
8. Eternally on the job with a firm and fair enforcement of policy.

A standard safety organization will reduce the rating automatically five per cent. Also, this organization, if properly functioning should reduce the rate a further ten per cent, thereby making a safety organization effect your rating fifteen per cent.

Anticipating that possibly some readers would be interested in what is meant by a "Standard Safety Organization," the outline as contained in the Handbook of Industrial Safety Standards, follows. These standards comprise the requirements of the Industrial Compensation rating schedule, and are the measures of the schedule rating in the following states:

Maine	Louisiana	Delaware
Vermont	Tennessee	Virginia
New York	Minnesota	Georgia
Pennsylvania	New Hampshire	Texas
Maryland	Massachusetts	Kentucky
Alabama	New Jersey	

Safety Organization.

The subject of this section may be described as organized work for the prevention of accidents. To be effective, safety work must be organized with the same thoroughness that manufacturing operations are organized. For purpose of reference it is necessary to maintain records of safety organization, for instance: The number and character of recommendations submitted by the safety inspector to the supervising committee, the number of these carried out, the number under progress and the number

not acted upon. This can readily be accomplished by noting at the end of each month or other convenient interval not to exceed three months—

The number of new recommendations made.

The number of recommendations carried out.

The number of recommendations which are uncompleted.

The number of recommendations which have not been begun.

Safety Organization is divided into three branches of work:

Supervising Committee.

Inspection Service.

Education of Employees.

The first of these, supervision, is of little value unless inspection service is also carried on. The requirements for plants of different size are outlined in the following pages in order:

Class A—1 to 150 employees.

Class B—151 to 500 employees.

Class C—501 employees or more.

Class A—1 to 150 Employees.

Supervision.—There shall be a General Committee, consisting of not less than three persons, one of whom shall be selected from the following: manager, superintendent, engineer, master mechanic, foreman, or other employee in a position of authority.

The Committee shall:

Review and approve inspection reports.

Pass on all recommendations to determine their practicability. For this purpose, meetings shall be held at intervals of not more than one month, and written records of such meetings shall be kept.

Record and familiarize themselves with the cause of all accidents for the purpose of devising methods which shall tend to eliminate similar accidents.

See that new employees are properly instructed as to the hazard of their work, and that employees of the different departments are educated in safety practices through the use of bulletins, printed rules or oral instructions.

Inspection Service.—There shall be some competent person with knowledge of industrial safety standards in charge of inspection service, who shall make regular weekly inspections of the plant. Such person shall fill out and sign regular weekly reports showing conditions of the plant and recommendations for changes. These reports shall be kept on file in the office and available to inspection. Standard blanks for inspection reports are furnished by the insurance carriers.

The Safety Inspector shall:

Follow up general lines of outstanding safety work and record them.

Make or arrange for regular inspections of special equipment, such as elevators, cranes, engine and motor stops, etc., and shall keep written records of each inspection.

Look after fire conditions, extinguishers, filling of fire (water and sand) pails, and keeping exits clear.

See that drawings and specifications for new machinery include the guarding (in accordance with Standards) of gears, sprockets and couplings, etc. Inspect new machinery before it is placed in operation and see that necessary Standard safeguards are provided.

Education.—Suitably located bulletin boards shall be provided, in which safety bulletins (which shall be changed at least monthly) and safety orders, rules and information shall be posted.

Class B—151 to 500 Employees.

Supervision.—There shall be a General Committee consisting of not less than three persons, one of whom shall be selected from the following: manager, superintendent, engineer, master mechanic, foreman, or other employee in a position of authority.

This Committee shall:

Review and approve inspection reports.

Pass on all recommendations to determine their practicability. For this purpose meetings shall be held at intervals of not more than one month, and written records of such meetings shall be kept.

Record and familiarize themselves with the cause of all accidents for the purpose of devising methods which shall tend to eliminate similar accidents.

See that new employees are properly instructed as to the hazard of their work, and that employees of the different departments are educated in safety practices through the use of bulletins, printed rules or oral instructions.

Supervise the safety inspection work.

See that drawings and specifications for new machinery include the guarding of dangerous features such as gears, sprockets, and couplings. Inspect new machinery before it is placed in operation and see that necessary safeguards are provided.

Inspection Service.—The General Committee shall make not less than one thorough inspection of the plant each month and submit written reports of recommendations for safeguarding or approved safety conditions which they consider desirable. Reports shall be signed by members of the committee.

There shall be some competent person with knowledge of industrial safety standards in charge of inspection service, who shall make regular weekly inspections and reports showing condition of the plant and recommendations for changes. These reports shall be kept on file in the office and available for inspection. Standard blanks for inspection reports are furnished by the insurance carrier.

The Safety Inspector shall:

Inspect for maintenance of safeguards, general order and arrangement of materials, cleanliness and lighting.

Make or arrange for regular inspections of special equipment, such as elevators, cranes, engine and motor stops, etc., and keep written records of each inspection.

Look after fire conditions, extinguishers, filling of fire (water and sand) pails, and keeping exits clear.

Investigate, record and report on all accidents.

Education.—Suitably located bulletin board shall be provided on which safety bulletins (which shall be changed at least monthly) and safety orders, rules and information shall be posted.

There shall be at least semi-annual meetings of employees at which talks on safety shall be given.

Class C—501 Employees and Over.

Supervision.—There shall be a General Committee of not less than three persons, one of whom shall be selected from the following: manager, superintendent, engineer,

master mechanic, foreman, or other employee in a position of authority.

This Committee shall:

Review and approve inspection reports.

Pass on all recommendations to determine their practicability. For this purpose, meetings shall be held at intervals of not more than one month, and written records of such meetings shall be kept.

Familiarize themselves with the cause of all accidents for the purpose of devising methods which shall tend to eliminate similar accidents.

See that new employees are properly instructed as to the hazard of their work, and that employees of the different departments are educated in safety practices through the use of bulletins, printed rules, or oral instructions.

Supervise the safety inspection work.

There shall be a Workmen's Committee of not less than three workmen. The personnel of the committee shall be changed at regular intervals preferably by rotation.

The Committee shall:

Inspect for maintenance of safeguards, general order and arrangement of materials, cleanliness and lighting.

Look after fire conditions, extinguishers, filling of fire (water and sand) pails, and keeping exits clear.

Inspection Service.—The Workmen's Committee shall make not less than one thorough inspection of the plant each month and submit written reports of recommendations for safeguarding or approved safety conditions which they consider desirable. These reports shall be signed by members of the committee.

There shall be a Safety Inspector who has knowledge of industrial safety standards and who shall devote at least one-half of his entire time to safety inspection work. He shall keep records as required herein, and shall:

Follow up general lines of outstanding safety work and keep records of same.

Make general inspection of plant and machinery and make written recommendations for necessary Standard safeguards or safety precautions.

Make or arrange for regular inspections of special equipment, such as elevators, cranes, engine and motor stops, etc., and keep written records of such inspections.

Inspect for maintenance of safeguards general order, and arrangement of materials, cleanliness and lighting.

Look after fire conditions, extinguishers, filling of fire (water and sand) pails, and keeping exits clear.

Investigate, record and report on all accidents.

See that drawings and specifications for new machinery cover the guarding in accordance with standards for dangerous features, such as gears, sprockets and couplings. Inspect new machinery before it is put in operation and see that necessary Standard safeguards have been provided.

Education.—Suitably located boards shall be provided throughout the plant on which safety bulletins (which shall be changed at least monthly), and safety orders, rules and information shall be posted.

There shall be at least semi-annual meetings of employees at which talks on safety shall be given. Safety Literature, such as printed operating rules, warning signs and notices on payroll envelopes, shall be provided or distributed among the employees.

The United States Testing Company, 340 Hudson St., New York City, have just published a booklet of useful tables of weights and measures, textile tables, physical tables and chemical tables. A descriptive story of the work of the company with a full explanation of the standard tests made for various industries which it serves is also outlined. A limited list of useful books and periodicals which may be used as a good working beginning of a more extensive library for textile manufacturers and mill laboratories is given. These include books on textile fibers, manufacture, tests and analyses; bleaching, dyeing, printing and finishing; chemistry and biology; physics, microscopy, and photography; dictionaries and reference books, etc. The booklet may be had at a nominal charge upon application to the company.

JACQUARDS AND HARNESSES: Card-cutting, Lacing, and Repeating Mechanism, by Thomas Woodhouse, textile expert and head of the weaving and designing department of the Dundee Technical College. 424 pages. 402 cuts.

There has been an irregularity in the procedure of literature upon textile subjects, and while comprehensive information may be found in certain branches, other phases have not been adequately treated. This book is intended to remedy one such defect in connection with the subject covered. It deals exhaustively with a large number of machines which are used for the preparation of jacquard cards for weaving carpets, damask, tapestries, brocades, quilts, lace, and similar textures, and contains many elaborate designs with full instructions regarding harness ties, and all operations that are essential for the cutting, lacing, repeating, wiring and repairing of jacquard cards. Particular attention is given to the various positions which the cards may occupy on right- and left-hand looms and to the changes required to produce the design correctly.

Over 400 illustrations have been introduced to present the different pictures of machines with the object of rendering the book useful to all who are engaged directly or indirectly in the manufacture of various kinds of decorative fabrics. The range of machines described and illustrated by photographs and line drawings is extensive, since it embodies several systems of card-cutting, and it is believed that few well-known machines have been omitted.

Mr. Woodhouse, the author, is known to the readers of COTTON as the writer of a number of series of articles on designing that have appeared in COTTON'S columns from time to time, and also as the author of other books on this subject. "Jacquards and Harnesses" may be secured through COTTON'S Book Department, or direct from the publishers, The McMillan Company, 64-66 Fifth Avenue, New York City.

"The New Industrial Era" is the title of Sir Charles W. Macara's latest book, in which are included as a permanent record a number of the articles written by this well-known figure in the British cotton industry for papers and magazines in this country and abroad. In this latest compilation, the writer shows the unique position occupied by the British Empire among the nations of the world in this new era, and is calculated to be an effective force in dispelling the dismal foreboding in evidence in certain quarters. The publishers are Sherratt & Hughes, 34 Cross Street, Manchester, England.

The Cerulean Ruminant and the Inferiority Complex .

The Eighth Modern Fable

NOT BY AESOP.

Sometime back we had an old goat around our mill. No, I don't mean any of the overseers or second hands, nor any of the help, not even the Super. This was a real goat. A real he-goat, with a real he-goat aroma, a benignant smile, a mellifluous voice. The epitome, we might say, of goatly virtue—all butt.

He was the mill mascot. That is, on the windward side he was. On the lee, or down-the-wind side he was something else which had really never been put into words because no one caught in that unfortunate position had ever tarried long enough nor had breath enough to make any verbal comment. His name was Mephistopheles, commonly shortened to an affectionate Meph which, to be exact, was often pronounced Mph! and sometimes Phew!

He was the official lawn mower and performed his duties faithfully, dusting off each little blade of grass carefully with his beard before he bit it off, and would have been at it still if a paling hadn't come off the Super's fence. The Super's little daughter Mary had a pet ewe lamb which strayed through the hole and met up with Meph back of the dyehouse. It was a case of love at first sight—until the wind shifted. Then Mary's lamb lit out for home making strangled noises something like my pet gold fish does when it tries to sing under water. That seemed to hack Meph considerably, sort of got his goat, you might say, and he moped around several days and wouldn't eat a thing until the dyehouse boss guessed what ailed him.

"That there goat," he said, "has got one of these complexes you read about nowadays. It's an inferiority complex I reckon, on account of Mary's lamb not having anything to do with him and the old fellow is just blue, that's all. He's so blue in his mind that the grass doesn't look right to him and he can't eat it.

"Well," I suggested, "blue and yellow make green."

"You got some sense after all," he agreed, and stole a pair of yellow goggles the Super used when he went automobile riding and fitted them to the goat. That must have made the grass look all right, because Meph went right for it and everything was pretty again, except that our president called up the Super over the 'phone and said he had just driven by the mill and wanted to know what the Super meant by going to sleep out in the long grass right in front of the mill where everybody could see him and what was the idea of the yellow goggles. While the Super was trying to explain, he happened to look out where Meph was taking a little snooze by the front steps and remarked pleasantly and to the world at large that it was danged discouraging to pass a whole life time trying to be a prominent and progressive citizen and wind up by being accused of looking like that, and that while he felt a fatherly interest in all of us and tried his best to win our loyalty and confidence and affection, and felt as kindly towards us as any father could feel about a lot of worthless sons, at the same time if he ever found out just who fitted that goat with his goggles, a certain locality he could name if he wanted to would be cold in comparison. I remembered a job at the other mill and went over to attend to it.

So when the old man took his glasses away from Meph things looked wrong again, and that very afternoon Meph strayed into the dye house and fell into the indigo vat. The dye house boss says Meph thought the foam on top was grass and couldn't tell the difference; anyway, we fished him out and hung him on the back fence by the horns to dry, but he never seemed to get over it. Next day when he was around by the Super's house and Mary's lamb hollered "Bloo" at him instead of "Blaa," he staggered back to the dye house, laid his head in the boss' lap, whistled a sigh through his teeth up at him, and kicked the bucket. When the dye house boss recovered from the sigh, and found that the goat wasn't going to, he had him carted off and the Super's wife had a new set of blue furs a couple of weeks later. Next day the dye house boss asked me over to the house to dinner. Said he had some nice veal stew. I didn't go. After being out a week he showed up again and seemed to be somewhat depressed. He sat down on my desk and said, "The old place don't seem the same since Meph left."

"The air is a little fresher," I agreed.

"No, I don't mean that way at all, but I can't help thinking that goat would have been as well and strong as ever if he hadn't let that little lamb put it over on him that way. Why, I've seen folks that same way. They get something on their mind, just some little thing that really doesn't amount to anything like a little bit of bad work or a friendly bawling out from the boss and it gets them so they never do get big enough to climb over it.

"Take that goat for instance: Mary's lamb thought he wasn't good enough to associate with her, and he didn't have any more sense than to take himself at her estimate and believe it."

"Maybe he realized he was in bad odor," I suggested.

"Now don't try and be funny. I'm giving you some philosophical reflections here that may be worth writing down in a book for all you know. Naturally, anybody's feelings would be hurt the same as Meph's, but is that any reason for him to lie down and die of the blues? I ask you!"

"I've just figured out what he was whistling through his teeth when he came into your office and flopped," I said. "It must have been the Dye House Blues."

"I wish you'd keep still while I've got my mind set on this thing. I've known lots of folks worse than that goat. He was really a useful member of the force around here and if he hadn't gone and convinced himself that he was no good and got his brains all gummed up with worry and his pride hurt he might have continued for a long time to fill a relatively important place."

"With grass," I said. "He kept it full, all right. Go on."

"Well now, you know most folks are like that. As long as things go along all right they think they are the best ever hatched out. Sometimes they think they are a little

bit better than they really are, which is a good thing after all, but when anything goes wrong they just haven't the backbone to live through it. Some fellows will hurry up and jack the job for fear they are going to get fired, without waiting to see whether they are really in trouble or not, and others will get so discouraged they will lie flat down and actually get in the way so the boss will have to drag them out before the job can be run.

"That's what you call an inferiority complex, which are two big words that don't mean a thing except that you've convinced yourself that you're not as good as whatever it is you're up against. You hang your head down and you say that you're licked and first thing you know you are sure enough, and the undertaker sends his longtailed coat to the pressing club and the choir gets another chance to sing.

"It must be an inheritance we poor dubs have had left us by our ancestors way back yonder when they had to sleep up in a tree to keep from furnishing some of the other wild animals a free lunch, but it is because man has been able to get over his inferiority complex and throw his chest out and say, 'By Heck, I'm as good as anything else in the world, and I'll have 'em all under my thumb before long,' that he has been able to do that very same thing and become the ruler of the world. Of course every now and then something would come along and throw him for a row of tombstones, but in the end he would always shake the dust out of his hair, spit on his hands, say 'Oh well, my foot slipped that time,' and have another try at it, and it is that indomitable will to do, which has carried us through; the fighting, grit your teeth and try it again, good as anybody or anything spirit that we have developed since we left the jungle trails that the poor old goat didn't have and died for the lack of. Am I right? I ask you!

'No, I don't ask you. Keep quiet. If you say anythig at all you will try and be fresh. That goat's been a real inspiration to me, and there's something else about him that I've always admired and absorbed you might say to a certain extent, something that I feel full to neck of right now. It's his——"

"Stew," I suggested.

"Of course not! It's his pride of workmanship. Did you ever notice how careful he was with that grass, how he bit off every little blade just so long and made them all come out even? Wouldn't it be fine if everybody would be that particular, each in his own humble capacity? I know it's that way with me in the dye house. Every time anything goes wrong, like a shade off, or something like that it hurts me all over."

"Especially if the boss finds it out," I put in, but he pretended he didn't hear me.

"Of course you can't afford to let such things get ahead of you. Just as soon as that goat got all snowed under with the idea that he was no good, it began to show up in his work. That grass looks awful ragged now, and it would be the same with me if I wasn't on the job all the time—"

"Did you get that sample of yarn the Super wanted?" I asked.

"Oh well, I don't have to worry about that now. He's going off this afternoon and won't be back this week. I'm going to get a bawling out, but I won't worry about it until I get it. I can't dye that yarn like he wants it because we ain't equipped for that kind of work. He wants to duplicate that fancy looking yarn they make over at the Whatsname Mill and we just haven't got the rigging, that's all. He thinks we can do it, and he's darn hard to convince, but I'll bring him around all right."

"This complex stuff must be catching," I said. "Go out to the Super's back fence and let Mary's lamb yell 'Bloo' at you and then come back in here and croak. I'll plant you right close to your model friend and put a bunch of wild onions over each of you. Besides that the Super didn't go off. He's still here."

"Holy hot hinges!" said the dye house boss jumping off the desk. "Say, you don't mean that old man is still around here, and me killing time like this? You know, confidentially now, he reminds me of that goat some."

"That's what the president thought," I said, "but you'd better not let him hear you say so. You know what he said about those goggles."

"Oh I don't mean in looks, but he's got a good side and a bad one, and if every thing's all right and you are on the right side it's pleasant enough, but if you get around on the other side, Gosh! I guess I'd better go fix up that yarn. I think I've got a way figured out. I don't want you to think it's just on account of the old man's being here, though. I can work without being watched. It's just that you can't keep us down, eh? Kings of the universe, that's what we are. We've got a grand inheritance that we've got to live up to. A heritage, you might say of—of—say, here he comes now, so here's where I skip."

And maybe the dye house boss is right after all. I don't know, so I leave it to you.

E. S. Draper, landscape architect and engineer, with main office at 11 East Fifth St., Charlotte, N. C., has opened a branch office at 101 Marietta Building, Atlanta, Ga., under the management of C. G. Mackintosh, for the general practice of landscape architecture and engineering.

On the occasion of a recent visit to the Universal Winding Company plant by Joseph R. Leeson, president of the company, service emblems were presented to all members in the company's employ for a period of ten years or more. These emblems were of bronze for 10 to 15 years service, of silver for 15 to 20, gold filled for 20 to 25, and solid gold for 25 years and over. It is of interest to note that a total of 169 Universal officials and employees received these medals; 15 meriting the solid gold medal for service of at least 25 years; 33 securing the medal for 20 to 25 years service; 36 being recognized for service of from 15 to 20 years; and 85 being awarded the bronze emblem for from 10 to 15 years service.

It was pointed out by Mr. Leeson in connection with the presentation of these emblems that "no single element is more far-reaching in its effect upon the stability and successful operation of industrial organizations than continuity of service," and that these emblems were awarded in recognition "of your loyalty, efficiency and ability in furthering the interests of the corporation through the many years of coordinated effort which has distinguished your relationship with the corporation."

This indeed presents an evidence of a spirit that could well be emulated in any industrial organization.

Human Relationships in Industry

BY W. M. McLAURINE.

The Interview.

In this article I shall discuss the topic indicated in the caption. The foregoing articles have been a rather analytical discussion of the content of things that should be developed in order to have a systematic and scientific interview.

In the development of "The Interview" in this article I shall discuss it from a slightly psychological point of view.

There are a few introductory statements that should be made in the beginning as they may develop a proper mental state on the conference for the development.

1. Hiring and firing has nearly always been done in a haphazard way.

2. Hiring has been considered simply as taking a man if you need him and firing him without much ceremony.

3. There once was a type of overseer who prided himself on being "hard-boiled."

4. He has not been gone so long as to have his influence forgotten.

5. There once was a great chasm between the overseer and the help.

6. This has been spanned in most mills, but in some places the bridge is not used as much as it could be by the overseer or the help.

7. Help has often felt that it was only a temporary expediency or experiment.

Therefore there was not much stability connected with the job. He regarded himself only as a temporary resident.

8. This condition is passing and in most mills has passed. The help has not fully realized it yet.

9. The help approaches an employer with some or all of these mental states.

10. The overseer is the direct and personal representative of the management and the mill.

11. He interprets the management to the help, and the help to the management.

12. Many people who want work are lifeless, listless and temporary in their desires. This is a common characteristic of all workers.

13. First impressions are often the most powerful and most lasting. They are hardest to overcome.

Taking these points into consideration the overseer or employer should approach the applicant.

Confidence is the great basis upon which all progressive movements travel. It is the basis of friendship, business and government. In the interview the employer should be so honest and open with the applicant that the applicant will soon feel that he has met a real man, a man who understands men and can enjoy their confidence. His attitude should be that of wanting to do the fair thing for the company and the applicant. He should not give evidence of impatience or hurry, although such may be the case. He should not dodge issues or facts that should be told the applicant. His attitude, often, will have a distinct bearing upon the attitude of the applicant. He should make the applicant feel that he is looking for good help, in fact the very best obtainable, and when once it is found the mill and employers are ready and anxious to receive them into its industrial and social life.

In the foregoing articles many things have been suggested, many questions have been asked, but these were used only for discussion and to create a background for intelligent interpretation of the reactions of the interview. To renew your mind on the fundamentals of what may profitably be discussed in an interview, I will recall several things that were discussed in one of the articles. There are five things that we want to know about an applicant for a position or job: (1) What he knows and what he can do? (2) Where he has worked? (3) His character; (4) His attitudes; (5) His economic status. Then, toward the latter part of the discussion, there was developed a list of information that possibly the applicant should have.

This may or may not be what we want to do in the interview, but I believe it will furnish us a basis for arriving at the fundamentals. How to put this over in an interview, now becomes our problem.

Too many questions are an abomination. They make us all grow suspicious and evasive. They put us on the defensive and, as one overseer says, they make us lie. We all realize this fact, and, furthermore, that is a state of mind in the applicant that we do not want to create. We want him to open up and honestly empty himself. I am of the opinion that if a little time were spent with the applicant creating this state of mind and as we talk here and there seemingly at random, we could do two things: first, create the right mental state on the part of applicant, and, second, figure out just what kind of questions that we should ask to get our information.

In fact, if we really need some help and think from first glance there is a probability of our employing the applicant, it might not be amiss to tell him some of the information about the mill that he should know if he is to be employed. Let me insist that this information should be "bona fide." It occurs to me if the overseer can win the confidence of the man and get him started to talking that he can direct the conversation into channels that will reveal the desired information. If questions must be asked they should be as few in number as possible and should be of such a nature that the applicant will feel free to answer fully. Furthermore, they should be framed in such a way that they will reveal the information that it is necessary to have.

Most interviews are hurried, and end with the statement, "Come around and I will try you out, and see whether you will do." This may or may not create the right mental attitude on the part of the applicant. A superintendent of one of the big cotton mills of Georgia said to me one day, "The biggest thing in a cotton mill is not the machinery and equipment, not the size of the plant and its layout—the biggest thing in a mill is the attitude of its employees." If this statement is true, and I believe it is, the overseer should start on the attitude of the new employee as soon as possible, and the interview is the first opportunity that he has of giving attention to it.

If the applicant is accepted he should feel that he is coming into a cooperative organization, an organization in which the "square deal" is a fundamental, and instead of the old feeling that has in past days existed, he feels that every opportunity will be given him to make good. He should be made to feel that through the interview as reflected by the overseer. He should look forward to his active connection with the mill with pleasure and pride, not because of the wage he is to receive or the fact that he has secured work, but because he is to be a partner in work with an organization of high ideals and principles.

If it develops in the interview that the applicant does not suit the job that the overseer has open and it is necessary for the overseer to so inform the applicant, this can be done in a tactful, diplomatic way so that the applicant will understand and appreciate the attitude of the overseer. The overseer can explain to this job-seeker the conditions that prevent their bargaining and may be able to offer to him some concrete suggestions that will be of value to him in his wanderings for work. These people who are not so fortunate as to have steady jobs must be the wards of someone who can help direct their thinking or they may become undesirable citizens and workers as their philosophies may be directed by people unfriendly to the interests of employers, and employees also.

This may seem a side issue and irrelevant to the subject, but to me it seems that if we want to make infection doubly sure, we must watch on the outside as well as the inside and the industrial hobo or rejected applicant is more likely to have his imagination stirred and ideas of unfair treatment brought to the forefront than the satisfied industrious worker. But to get away from advice and back to the definite work of the interview. After we have proceeded thus far with our group and have possibly succeeded in getting the group our ideas thus far, it has been my observation that to have a laboratory study now is very interesting.

The leader can take some member of the group out and instruct him that he is to have every appearance of being a desirable employee, but there is one objectionable feature about him, and this feature is so objectionable that if it can be found out he will not be employed. He is then brought back into the group and is interviewed by each man in turn until this fact is revealed. The objectionable characteristic is not a catch problem, it is one of those that we find in every day life. A study is then made of the various interviews, and criticisms and suggestions are offered. The kind of questions used, and the number are discussed. Which of the group are good questions and which poor? Why do you so consider them? If it seems too large a problem to take the interview as a whole for discussion, it can be narrowed down to the character, attitude or economic status.

The leader can take a member of the group and privately post him so that he will seemingly have a good attitude, but there will be a hobby which will be extremely objectionable. Then let the men try to find it.

There are many types of men that can be used, such as the talkative man, the quiet man, the man who "knows it all," the man who has had no experience, etc. These types can all be planned by the leader and then presented for the group to try out on.

Again, when these certain objectionable features develop, and it is necessary to refuse employment, the members of the group can give exhibitions of how they get rid of the applicant in a fair, frank and candid way, so as to leave him feeling that he has had a square deal.

Following this laboratory exercise, a general round table discussion should follow—at which every man should feel at liberty to discuss, disapprove, approve, amend or nullify as far as he is concerned. If the discussion has been active thus far and all points suggested have been covered, and many more that have been suggested by various members of the group, the conference thus far will have been a success. One of the chief values of the conference method is to provoke discussion and to get the minds of the men all active on constructive thoughts.

In a law case, one lawyer asks a question and the witness answers. The opposing lawyer objects and asks the judge to rule it out. The judge sustains the objection and the question is ordered stricken from the records. It can not be stricken from the minds of the jury and lawyer number one knew it.

In conclusion, I want to state that no matter what you think thus far about the hiring problem, whether you agree or disagree, the evidence has been placed before you and you can't get it out of your mind, and your verdict will of necessity be influenced by it.

Notes and Reviews.

A recent publication of interest to mills doing export business is called "Whiteside's Textile Export Conversion Tables." The necessity for a usable conversion table or system for units of weights, measurements, etc., to the proper and systematic execution of orders for cotton piece goods is familiar to exporters. While it is pointed out that tables of conversion have been available for years, the publishers of this new system declare that it is the first set of tables so far compiled which eliminates all need for figuring, all equivalents being already worked out and listed in convenient form for instant use. The price of the book is $2.00 per copy postpaid, and the publishers are the Bragdon, Lord & Nagle Co., 334 Fourth Avenue, New York City.

"Cost Finding in Knitting Mills" is the title of a new book by Stephen R. Gordon, which is prepared for the progressive knitting mill executive. Cost finding and shop control or planning are subjects that are receiving increasing interest in these times, and the purpose of the author in this volume has been to furnish a treatise of the application of scientific principles and management to knitgoods manufacturing, prepared by a specialist in that line. The book opens with a brief discussion of the general principles of cost and planning, continuing with detailed descriptions of actual installation of cost systems as applied to the different divisions or kinds of knitted articles manufactured. It thus has a practical, direct application to the industry with which it deals. The author is the head of Stephen Gordon and Staff, consulting, industrial and cost engineers, of New York City. The book is published by Bragdon, Lord & Nagle Co., 334 Fourth Avenue, New York, and is now available at the price of $4.50 per copy, postpaid.

Determining Yarn Costs

BY S. R. GORDON
OF STEPHEN GORDON AND STAFF.

In industry today the executive is faced with a far different problem than that of a few years ago. He must now figure ways and means to reduce his manufacturing cost and operate on the most economical basis commensurate with the quality of his product.

He can no longer ignore cost and devote his entire energies to increased production, but must balance the two in order that his price may meet those of his competitors and still return a fair profit to his business.

The volume of production must be maintained at certain levels for the most economical production costs; particularly in the yarn spinning industry, also the labor and overhead expense must be controlled and wisely administered to obtain the best results. The first step therefore toward true economy is to know the exact conditions and figure manufacturing cost.

I have known cases where well intentioned efforts toward economy have resulted in greatly increased cost due to a breakdown of machinery that should have taken but a few minutes to repair and where the mill was delayed for hours and days because of an inadequate supply of repair parts; in other cases where labor has been cut down to the point where production in certain departments has fallen behind thus causing delays and increased cost through all the succeeding operations.

Economy is not an easy matter and unorganized efforts along these lines often leads to increased cost due to unforeseen contingencies. True economy must therefore be

Purchase Order No._____

FACTORY PURCHASE ORDER REQUISITION

Department_____ Date_____ 191__

Purchase agent please order

Quantity	Description	Average Quantity Used Per Month	Minimum To Be Kept In Stock	Balance On Hand

Vendor_____ Via_____

Delivery_____

Special Instructions_____

Approved by_____ Signed_____

This Requisition must pass through the Office and be approved before the article will be ordered. All deliveries must be receipted for by Receiving Department

Form 121-20M-8-5-18

Fig. 1. Factory Purchase Order Requisition.

Form 121-20M 12-26-17

PURCHASE ORDER

OUR ORDER NUMBER MUST BE MARKED ON INVOICE AND PACKAGES

2551

191

Please Ship the Following:

QUANTITY ORDERED	ITEM NO.	DESCRIPTION	DATE WANTED	PRICE

Route
Terms
Dpt.

By

2551

Please return this slip to us with dates below upon which you will make shipment.
We do not consider this order as valid unless confirmed by return of this slip.

ITEM NO.	DATE

Delivery promised on above dates

By
Date

Fig. 2. Purchase Order.

based on absolute facts and an accurate knowledge of production in relation to cost.

In the yarn spinning industry it is very easy for the executive to divide the total labor and the total expense, by the total pounds produced of an average number of yarn. Presumably he has determined his labor and expense cost, then by adding or deducting a certain amount per number he determines the cost for any number of yarn. That method is not only inaccurate but obscures the real cost and offers no detailed figures to guide the executive in the control of his manufacturing departments. Its only virtue is that it is easy, however, it is just as easy to get the proper figures and absolute departmental cost by kind and number of yarn. The proper information is then available to the executive giving him concrete facts and figures upon which to intelligently and accurately base his manufacturing and selling policies.

The "unit" method of determining yarn cost is worked out along the lines of minimum clerical effort to produce the desired facts and figures. It is explained in detail as follows:

Productive and Indirect Labor.

Strictly speaking, all labor is productive. However, in determining the labor cost of a product there are certain items of labor that actually perform operations on the product itself which are designated as productive labor. There are other items of labor that do not actually perform operations on the product itself such as foremen, repair men, stock men, etc., which are considered as indirect labor and included in the overhead expense of the plant.

Contributory and Productive Departments.

In a yarn mill there are certain well defined operations through which the yarn progresses in the course of manufacture. The mill is divided into departments in each of which similar operations will take place as mixing, picking, carding, combing, drawing, slubbers, speeders, spinning,

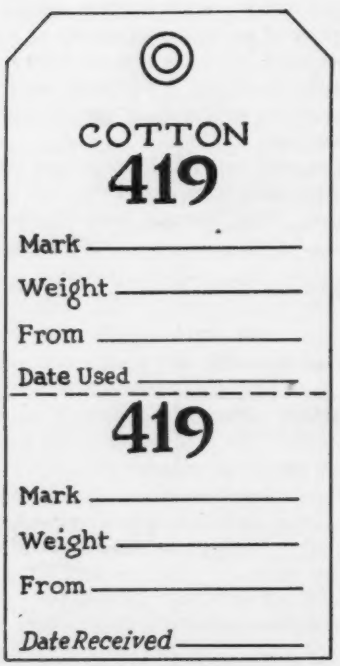


Fig. 3. The Bale Tag or Ticket.

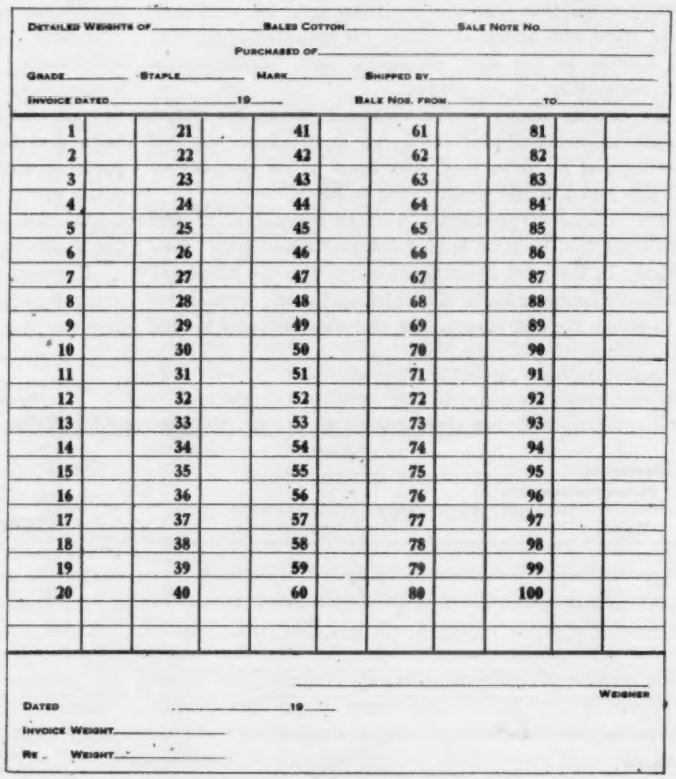


Fig. 4. The Receiving Record

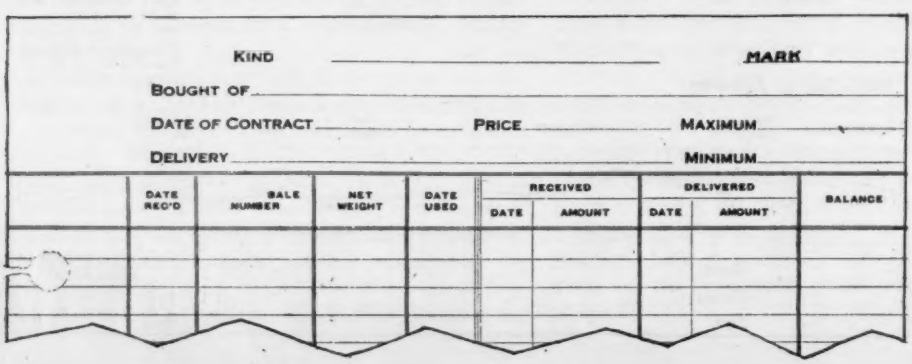


Fig. 5. The Contract Record.

winding, doubling or twisting, and mercerizing. These departments are known as the productive departments of the mill.

There are other departments that do not directly perform any operation upon the product, which are known as contributory departments and include the repair department, boiler house, light and power, office and the general factory department.

The information conveyed to the executive of the per cent of productive labor and the unit costs of the product

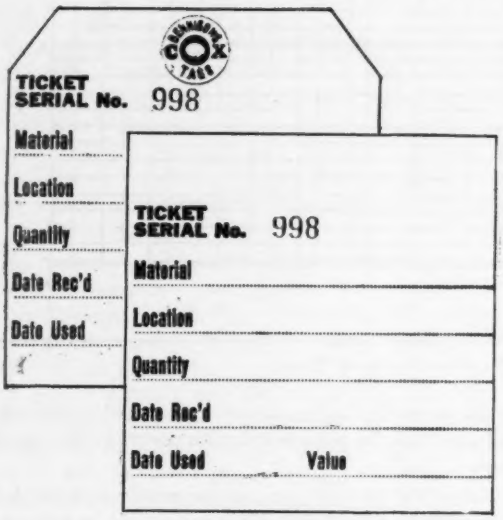


Fig. 6. Identification Tag.

in the various departments is invaluable in depicting the manner in which the foremen are conducting their departments.

We will now proceed with the detailed discussion of the plan for securing the cost of materials, labor and expense in a yarn mill and the compiling of the final cost of each number and kind of yarn.

Materials and Supplies, Their Purchase and Issuance.

The operating mechanism of a plant may be absolutely perfect, but may be unable to work to the utmost advantage because there does not exist a proper method for keeping the different departments supplied with the materials and supplies to be used in the manufacturing.

To avoid careless or prolific ordering of materials and supplies by the foremen, Factory Purchase Order Requisition, Fig. 1, is used. This requisition is made out by the foreman as an executive, and forwarded to the order clerk or purchasing agent who makes out the purchase order.

Purchase Order, Fig. 2, combines several features that are of distinct advantage. Across the top of the last copy, which remains in the purchasing agent's office, will be noted figures and letters indicating the days of the month and the months of the year. By attaching a metal tab several days before the goods are wanted, and if they have not already been received, the attention of the purchasing agent will be attracted, so that he can communicate with the seller in order to hasten the shipment. An extra copy of the purchase order is prepared and sent to the receiving clerk to appraise him of what is expected.

Bale Ticket, Fig. 3, provides a convenient method of recording cotton. When the cotton is received, one ticket is made out for each bale, noting the "Mark," "Actual Weighed Weight" and "From Whom Received." Receiving Record, Fig. 4, is also made out noting the bale numbers and weighed weights, one copy of which is returned to the office together with the lower half of the bale tickets.

The upper half of the bale tickets are attached to the bales of cotton which are then stored or put aside waiting

INVENTORY CARD

LOCATION OF STOCK ARTICLE

MAXIMUM MINIMUM ORDER QUANT UNIT

ON ORDER			RECEIVED					USED			BALANCE	
DATE	PURCH ORDER NO	QUANTITY	DATE	PURCH ORDER NO	FROM	QUANTITY	UNIT COST	DATE	QUANTITY	UNIT COST	DATE	BALANCE

Fig. 7. Stores Inventory Card.

MATERIAL AND EXPENSE SUPPLIES SUMMARY MONTH OF 19

KIND OF COTTON	POUNDS USED	VALUE	NOR'L PRICE	NORMAL VALUE	MISC. MATERIAL DESCRIPTION	MISC. MATERIAL VALUE	EXPENSE SUPPLIES DEPARTMENT	MISC. SUPPLIES	BROOMS	TWINE ETC.
Single Carded										
					Dyestuffs					
							Gen. Fact.			
							Pick Mix Lap			
							Card			
							Comb			
							Draw, Slub			
Double Carded							Speeder			
							Spin			
							Wind			
							Mercerize			
							Etc.			
Combed										
TOTAL					TOTAL		TOTAL			

Fig. 8. Material and Expense Supplies Summary Sheet.

for classification from samples of the bales designated for that purpose.

The receiving record and the bale tickets are first checked with the invoice and then posted to the Contract Record, Fig. 5, one sheet for each kind and mark of cotton.

When the bales of cotton are delivered to the opener department, the bale ticket is removed, noted with the date opened, and forwarded to the office. The other half of the ticket delivered to the office when the cotton was received, filed by cotton mark and bale numbers, is taken from the file, clipped to the upper half of the ticket and checked on the contract record and the weight noted under the column headed "Delivered."

For dyestuffs, etc., the same method of ticketing the containers, barrels, etc., is used except that Identification Tag, Fig. 6, is used in place of the bale ticket. The stock records of materials other than yarn are kept on Stores Inventory, Fig. 7.

It is very often possible for a live purchasing agent, with the proper statistical records, to be an active agent in the lowering of manufacturing cost through a reduction of the stock of materials and supplies carried on hand, and yet almost wholly overcome delay in manufacturing due to shortage of certain items. Not only are these methods of value in insuring an even flow of material and supplies into and through the process of manufacturing, but they are of inestimable value in getting costs, as they provide a record of materials used and the supplies consumed in each department.

Material and stores is taken off at the end of each month from the bale tickets, identification tags and requisitions for materials and supplies consumed during that month. The form is self-explanatory, except for the items, "Normal Price" and "Normal Value."

At the end of each month a recapitulation of the Contract Record Sheets, Fig. 5, is made, taking off the pounds of cotton consumed. The pounds of each kind and mark of cotton are multiplied by the cost price noted at the top of each sheet and the pounds and value posted to the summary sheet.

The selling price of yarn, or the articles into which the yarn is to be manufactured are usually set in advance of each season's business. These prices are based on an estimated cost, determined by the market, cotton actually on hand and contracts for future delivery. The estimated cost of the cotton used as a basis for the selling price is taken as the *Normal Price*. These prices are listed on the Material Summary in the column of that heading. The total pounds of each kind and mark of cotton consumed during the month are multiplied by the normal prices obtaining the Total Normal Cost of the cotton consumed during that month. The difference between the actual cost of this yarn and the Normal Value shows whether a purchasing profit or loss has been made.

This report is a very valuable guide to the executive in the purchase of cotton for if a loss is shown, it may be advisable to advance the selling price of the finished article, or on the other hand, if a profit is shown, it might be best to reduce the selling price, and secure a larger volume of business.

[This is the first of a series of articles by Mr. Gordon on yarn costs.]

Clayton A. Eddy, who has joined the Industrial Advertising Company of Detroit, has had a wide experience in advertising and sales work. For five years he was manager of advertising and sales promotion of the American Blower Co., Detroit, and for two years previous was assistant advertising manager of the Studebaker Corp. of America. He was also advertising manager of the Toledo Scale Co. and the Detroit Stove Works. His experience with these well known industrial corporations will enable him to give clients of the Industrial Advertising Company a high grade of advertising cooperation.

Processes for Finishing Cotton Ducks

BY WILLIAM B. NANSON

Waterproofing Cotton Ducks.

A waterproof or rather a water repellent condition is often desired, and the materials used in obtaining this effect are very varied. In the case of goods dressed with gelatin, waterproofing may be attained by producing formaldehyde gelatin. Tannate of gelatin may also be employed.

To produce this body, the goods are treated alternately with a bath of gelatin and tannic acid, and subsequently dried. Formaldehyde gelatin is produced by adding about two per cent of formalin (40 per cent) to the gelatin solution and dressing the goods with it and drying them up. By this means the gelatin becomes quite insoluble in cold water owing to the formation of a compound of formaldehyde and gelatin.

The same result is obtained by first dressing the goods with gelatin and subsequently passing them through a bath of formaldehyde and drying. Formaldehyde is generally used under the name of "formalin," which is a 40 per cent solution of the aldehyde.

A gelatin dressing may also be rendered less soluble, and, therefore, more resistant to water, by adding potassium bichromate to it. In the foregoing methods, solutions of casein may be substituted for gelatin. Casein may also be rendered insoluble by means of a bath of dilute acid.

Insoluble soaps are often used for waterproofing. The soaps of lime, magnesium, barium, calcium, zinc, and aluminum may all be produced by double decomposition, the fabric being first saturated with a solution of sodium soap, and subsequently treated with a solution of a soluble salt of the heavier metal. These soaps, particularly those of calcium and magnesium, are, however, liable to decompose with the liberation of the fatty acids, and are not therefore suitable for light colored goods. Barium and aluminum soaps are more stable. The soaps of carnaubic acid are the most stable of all and have excellent waterproofing properties.

Carnauba wax belongs to the vegetable waxes which are produced as exudations from the leaves of trees. It is obtained from a South American palm. It is a very hard, brittle substance with a slightly yellowish color, though it may be bleached quite white. It has a remarkably high me'ting point, ranging from 80 to 84 degrees Centigrade. It does not melt readily with water, but in the presence of an alkaline carbonate an emulsion may be obtained having very marked stiffening properties. It may be saponified by prolonged boiling with alkali, and the fatty acid obtained may be precipitated by a suitable salt upon the fabric. The fatty acid (carnaubic) has a melting point of 72.5 degrees C. The zinc soap made by treating a solution of the sodium soap with zinc sulphate is a white substance which, unlike other soaps, does not decompose on keeping, and is a very good filling, stiffening and waterproofing material. It is fairly soluble in benzene.

Many of the soaps are soluble in benzene and may be dissolved in this solvent instead of being prepared by precipitation. In this case the fatty acids are dissolved in benzene and applied to the goods, the benzene is then driven off by heat and recovered to be used over again, while the fatty acids are left in the goods as waterproofers.

Paraffin and waxes may either be put on during the calendering process or dissolved in benzene or other suitable solvent, the solvent subsequently being driven off by heat as already described. Rubber dissolved in carbon bisulphide may also be used.

Many patents have been taken out for waterproofing fabrics by the precipitation upon and in the fiber of a hydrated metallic peroxide or a tannin in combination with some other colloid substance such as albumin, glue, casein, the fatty acids, etc.

The waterproofing of khaki goods is caused by the colloid peroxides of iron and chrome precipitated in the fibers in most cases in conjunction with some fatty acid. This condition is the one known to the trade as repellent and renders the fabric in no sense waterproof, as the water can easily be forced through or drawn through the fabric by capillary attraction from the other side.

Lowry's process of making goods water repellent is one of the best ones, but is only suitable for bleached goods. By it he steeps the fabric for some hours in a boiling mixture of soap, glue and water and exposes it to the air until nearly dry. It is then digested for ten hours in a strong solution of alum and common salt, washed well and dried at a low temperature of not over 80 degrees F. This process gives good and effective results, but its efficiency depends too much upon the length of time used and the low temperature of the drying processes, which makes it not very practical. Moreover, it may be said that water repellency as produced by the precipitation of fatty or resinous soaps of the various metallic oxides is of a rather unstable character and will not remain repellent long after exposure to the weather.

The very best kind of a waterproofer is one that will permit of the wetting of the outer surface of the cloth, but which opposes the passage of the water to the other side, and there are a number of colloidal precipitates which will fulfill this requirement such as colloidal alumina and tin, gelatin, glue and casein, rendered insoluble in the fibers by chromic acid, alum or formalin.

Colloidal alumina may be prepared from the diacetate of alumina, this in the presence of much water; and heated, furnishes a hydrosol of alumina which is precipitated in a gelatinous form by the addition of a solution of sulphuric acid. The salt thus obtained has no effect on coloring matters and is insoluble in water and, therefore, cloth fully impregnated with it and dried is water repellent. An analogous salt to this can also be produced from alum as we shall explain further on when treating on fireproofing substances.

Gelatin, glue and casein may be applied to the cloth and then rendered insoluble and incidentally waterproof by chromic acid and formalin. In studying the behavior of gelatin and casein in this respect it has been concluded that compounds of the various oxides form insoluble compounds with gelatin; in the case of chromic oxide 3½ parts render 100 parts of gelatin insoluble, which is the more

stable the less it contains of free acid. Also that chromic acid and its salts render gelatin insoluble in the presence of light. Also that chromic aldehyde acts upon gelatin (or casein) either in a gaseous or dissolved state, that is, solution.

The finisher, however, must bear in mind that all waterproofing processes involving glue, gelatin or casein will render the cloth stiff, to obviate this it will be necessary to add castor oil or some neutral soap to the mixture to keep it soft and pliable. In this regard a process has been invented which has proved to be very efficacious. It renders goods—if fairly closely woven—absolutely waterproof, without preventing the air from percolating through cloth. It will easily wet on the outside, but the water will not go through unless forced through. The process is as follows: Thoroughly soak 30 pounds (or any multiple of it) of casein in water overnight. Next morning add enough ammonia to it to make it soluble; then add 15 pounds of pure tallow soap in solution, bringing the whole quantity up to fifty gallons; heat it, but do not boil it. Pad the goods with this mixture on a backfilling machine spreading the casein solution on one side of the cloth only and from this run the goods directly and continuously through an ageing machine charged with formaldehyde vapor, regulating the speed so that it will take about ten minutes to run any given point through the machine. Return the goods and repeat the process, spreading the casein this time, however, on the reverse side. After this second padding and ageing take the goods and run them through a cold solution of acetate of alumina at 7 degrees Tw., and wash and dry at as cool a temperature as is practicable, preferably in the open or drying room.

So far as is known this is the best process as yet discovered, involving as it does the colloid theory—there are other processes based upon the mixtures of albumin, glue, tannin, etc., but they possess no special merit over this.

I might say here that fabrics are waterproofed by impregnating them with fats, such as linseed oil, boiled oil, etc., or made impervious by applications of rubber, varnish, resin, pitch, tar paints, etc. Such methods give a protective coating which protects from the weather exactly as wood and other constructive materials are protected by paint. These latter methods, however, not only produce a coating which repels water, but one which also repels air, and it is not my intention to discuss them here, and therefore this series shall be confined strictly to chemical processes of waterproofing such as can be accomplished in an ordinary cotton mill or bleachery and dyeworks.

These processes which we call chemical and also those processes which act by stopping up the cells and pores of the fabric with an easily deposited substance are quite pervious to air. In the former case, precipitates of insoluble metallic compounds or of insoluble metallic soaps are produced in and upon the fiber by chemical reactions. In the latter, the fibers are soaked with paraffin, wax, etc., in solution. The solvent evaporates and can be re-used and leaves the paraffin, Carnauba wax, etc., behind in a state of fine division. Both classes of process yield products in which the fabric has suffered no change visible to the naked eye, but the paraffin coat is airtight for a time until the folding up in the cold of the cloth or garment breaks up the then brittle layer of paraffin. According to the treatment which the goods receive the impermeability to water is limited or practically boundless and the fabrics retain their original color, softness and suppleness, except in a very few cases. For example, if tannin is used, the color of the fabric becomes somewhat darker.

If a bleached or unbleached fabric is waterproofed with acetate of alumina, its appearance and feel remain exactly as at first. The following substances are used in particular for waterproofing fabrics: sulphate of alumina, alum, acetate of lead, acetate of lime, the sulphates of copper, zinc and iron, ammonium cuprate, chromate of potash, paraffin, ceresine, wax, soap, etc.

As an impregnating fluid acetate of alumina has great advantages. It must be prepared by the finisher himself, as the acetate of alumina of commerce will not answer on account of the tarry smell. Any one of the following methods of preparation may be employed: (1) Decomposing sulphate of alumina with acetic acid in the presence of chalk; (2) decomposing sulphate of alumina with acetate of lead; and (3) decomposing sulphate of alumina with acetate of lime.

Alum can be used instead of sulphate of alumina but the latter is preferable; it is cheaper, and it is free from iron. Methods (1) and (2) are more complicated and costly than method (3) so we shall confine ourselves to this latter method and proceed as follows: The usual proportions are 100 pounds of crude calcium acetate to 700 pounds of sulphate of alumina. These must be dissolved separately in water to a strength of from 5 to 8 degrees Baume, and then mixed. It is necessary to have plenty of room in the mixing tank to provide for the evolution of carbonic acid. When the evolution of gas has ceased, a sample of the mixed fluids should be taken, and part of it tested with barium chloride and part with sulphuric acid or oxalate of ammonium. If the barium chloride gives a precipitate the sulphate of alumina is in excess, and if the other reagent gives a precipitate there is too much acetate of lime, so that after the test, matters can be put right by adding more of whichever salt is deficient. This should be repeated until a precipitate is not given in either case. We then have an acetate of alumina which contains no more than traces of either ingredient. It is better to have an excess of sulphate of alumina than of acetate of lime. The mixture must now stand and settle as only the clear liquor must be used and this should be filtered through a cloth into the mixing tub when used.

The acetate of alumina solution is generally used at a strength of from 7 degrees to 12 degrees Tw. It must be clear and give no color with sulphuretted hydrogen. A white precipitate with that reagent shows the presence of zinc, while a dark coloration shows the presence of lead or copper. If five c.c. of the solution are mixed with ten c.c. of 90 per cent spirit there should be no precipitate but only an opalescence.

The crude acetate of lime has a grey, sometimes nearly black color, owing to the presence in it of tarry matters. Too tarry an acetate should not be used as it gives a very dark solution of acetate of alumina which is not easily decolorized, the color of course is not so material when used on dyed goods but the smell is, and the depth of the smell is usually as the depth of the color.

Impregnation of the Fabric.

The best form of machine for impregnating the cotton

duck with the aluminum is the one shown at Fig. 1, Part 2, of this series. To impregnate duck requires that the cloth lie in the liquor for at least overnight as the liquor is cold and the goods tightly woven. This machine must be fitted with a steam coil to heat the liquor, the temperature must in no case go above 100 degrees F., for if it does the solution of acetate is precipitated in the form of a basic acetate of alumina and becomes useless. The goods are run once in this and wound up on rolls, a bale to a roll, they are then left overnight and run again in the morning, taking care that the liquor is kept to full strength by necessary additions to it from time to time, and that the temperature is kept uniformly about 100 degrees F. or a little less. After running the goods again in the morning they must be mangled and dried up on the cans. The complete drying of the fabrics makes them waterproof by the formation in them of the insoluble basic acetate of alumina. A fabric waterproofed in this manner should show no damp places on the outside after being made into a pouch and kept full of water for several weeks.

If, however, absolute waterproofness be required, the goods must, after drying from the acetate of alumina, be run through a five per cent soap solution. The fabric which must be free from all acetic acid is drawn through this twice, or once through a two-box machine, or an open soaper, with a solution of weak alum water in the third box and water in the fourth box to thoroughly wash after the alum, mangle and dry up.

It is quite possible to incorporate rubber, paraffin, etc., into the fabric together with the insoluble alumina soap. This is easy to do, as the soap solution has the property of forming emulsions with fused waxes and paraffin, with petroleum or with a solution of rubber. A still better waterproofing may be secured by padding the goods in acetate of alumina as described and then soaping in a strong hot solution of soap and glue or casein, ageing in an atmosphere of formalin, then rinse off in cold water containing a little formalin in solution.

In any case the finisher must always remember that the acetate of alumina must go on the goods first and the soap, etc., afterwards, many dyers and finishers do the soaping first, which is wrong.

Many people prefer to waterproof their goods with ammonium cuprate, but it is the opinion of the writer that there is no difference between this method and that of the acetate of alumina, at least so far as waterproofness is concerned and, anyway, the ammonium cuprate method is only suitable for unbleached goods and cannot be used for dyed ducks. This ammonium cuprate process is the Willesden process for duck tarpaulins; it makes the goods mildew proof. This applies also to a large degree to the alkali "cellulose xanthate" process of waterproofing, though some dyed duck colors would doubtless stand it.

The method of applying this process to cotton duck is something like this: The cloth is first immersed and thoroughly saturated in a cold caustic soda solution standing at about 60 degrees Tw., through a machine delivering about 50 yards of cloth per minute, and must be squeezed nearly dry by heavy squeeze rolls. It is now exposed to the vapors of boiling bisulphide of carbon in an ageing machine or continuous steamer for ten minutes. The material can be exposed to an atmosphere charged with carbon bisulphide by passing a jet of steam into a little of the latter placed below the fabric in the box of the continuous steamer. The thiocarbonate of cellulose thus formed is then decomposed in any well known manner. The simple application of heat at 70 degrees F. or over, which the goods would receive in drying on the ordinary drying cylinders would suffice doubtless, but it would be advisable to decompose it by running the goods through some weak acid solution such as sulphuric acid, to thoroughly neutralize the free soda left in the goods; lastly, wash well in cold water, being careful to remove all traces of free acid and dry. I must repeat, at this point, the warning that it is about impossible to remove *all* traces of acid from duck goods by washing alone, and, therefore, at all times when ducks are to be dried up after souring and washing, they must be run through water at the last box or at the mangle containing a little ammonia, so as to completely neutralize any acid which may remain in the goods.

Fireproofing Cotton Ducks.

It is quite impossible to so treat cotton goods so that they will not burn at all, but it is possible to treat them so that they will become comparatively fireproof or rather "flame proof"—that is to say, they will not catch fire from any superficial flash of fire such as a burning match or a gas jet, they should not burst into flame under any circumstances but rather "char" slowly into carbon, be slow burning, as it were, and in this way to make them safe for awnings, tents, etc.

Now any process that will raise the kindling point of a cotton fabric, that is, the temperature at which it will combine with oxygen and take fire and burst into flame, will make for its fire resisting qualities and cause it to become "flame proof," and any active measures that are taken to produce this result must lie in this general direction.

Water acts as a fire resisting agent because it absorbs the heat necessary to bring the cotton to its kindling point, but when it absorbs sufficient heat itself it evaporates and the cloth being then unprotected absorbs the molecules of heat until its kindling point is reached when it, in its turn, will burst into flame and be consumed.

Now it is evident that any other substance which, like water, will not combine with oxygen or will quickly absorb and rapidly conduct and radiate heat, may be classed as fire resisting or non-inflammable, and may be used advantageously to protect cotton fibers from flame.

It has been shown that to make cotton fabrics non-inflammable we must look for something that will either raise their kindling temperature above that of ordinary flame, or something that will prevent the air, with which they are in immediate contact, from becoming heated to their kindling temperature.

To accomplish the former we must resort to purely mechanical means, by the application of fixed insoluble oxides, combined mechanically with the fabric such as the oxides of iron, alumin, tin, zinc, etc.; some of these, however, present the grave disadvantage of affecting to a greater or less degree the color of the goods.

To accomplish the latter, however, we have a wide field for operations, most of these being based upon some chemical action which would remove or replace the oxygen from the air immediately surrounding the fabric and substitute some other non-inflammable gas, such as nitrogen, ammonia, carbonic acid or oxide, etc., thus cooling the air surrounding the burning substance to a temperature below

its ignition point.

The atmosphere of this earth being composed of 77 per cent nitrogen and 23 per cent of oxygen, it is obvious that any substance having the power to remove the 23 per cent of oxygen from the air surrounding the fabric will act as a fire preventive, for if the oxygen is removed the remaining nitrogen will put the fire out, and it is upon this fact that many of the methods used to prevent the spreading of flame in cotton goods are based. The trouble with these are that they possess no permanence, they will either wash off in time or dust off or undergo chemical changes which render them useless for fireproofing goods, although they are quite useful where used in chemical fire extinguishers in which connection they perform good service.

In studying the effects of various salts on the combustibility of textiles it has been found that the most efficacious are the ammonium salts, zinc, tin, borax, boracic acid and alumin, the latter a precipitate of aluminate of soda with an ammonium salt. The zinc, tin and alum in conjunction with the ammonium salts have given the best and most permanent results. The ammoniacal salts, volatizing under the influence of heat with the oxygen of the air and other combustible gases, from mixtures completely incombustible, the former of which combine with the fabric, while the latter forms an inert and non-inflammable atmosphere in which nothing will burn.

Dyed ducks can be cheaply rendered fire resisting by soaking them thoroughly in a solution of acetate of zinc at 7 to 10 degrees Tw. and then drying on the hot cylinders. This leaves a hydrated oxide of zinc with some acetate combined with the fiber. The goods are now run through a hot solution of alum and dried without washing. The goods can be made permanently fire resisting, however, by impregnating them thoroughly with a solution of stannate of soda at 45 degrees Tw., and then precipitating the insoluble oxide of tin on the fiber by an ammoniacal salt. This process is expensive, costing about two cents per yard for 30-inch, 8 or 10-ounce duck, but it is effective and will not come off.

The efficacy of peroxide of tin as a fire resisting agent arises from the fact that the fiber has such a strong affinity for the tin oxide that it virtually becomes a part of it, and will never wash or wear off, and because the tin oxide, being at its highest state of oxidation, cannot combine with more oxygen and take fire.

I would suggest that in place of using stannate of soda (which is expensive) as a fire resisting agent, experiments be made with the analagous salt of alumina. It has been used under the name of alumin, and being in its highest state of oxidation it cannot burn, and being an insoluble hydrate, it acts in a mechanical way by rendering the fibers non-inflammable of themselves, while the ammonium chloride, volatilizing at a red heat, affords its usual gaseous protection, as explained in this article.

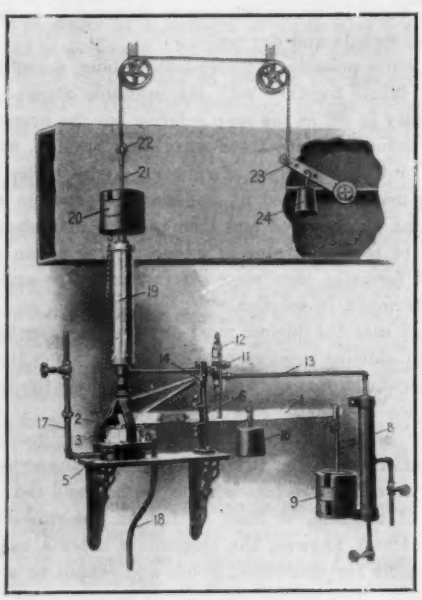
Aluminate of soda is made by dissolving powdered ammonium sulphate in a solution of caustic soda until it becomes saturated or until a precipitate begins to form. The fabric is padded in this (soaked) at about 15 to 20 degrees Tw. and dried. During the operation of drying the carbonic acid in the air seizes upon the caustic soda, which holds the alumina in solution, causing the formation of carbonate of soda and the precipitation of aluminum hydrate on the fiber. The time consumed in the drying, however, is seldom sufficiently prolonged to allow of the complete decomposition of the aluminate of soda. This is insured by afterward passing the goods through a dilute solution of chloride of ammonia, which immediately determines the complete precipitation of the alumin.

Now it will be seen, from what has been said, that if cotton ducks have to withstand washing or the action of rain or water, the methods of fireproofing involving tin oxide or alumin as their leading feature are clearly indicated as the most desirable. If, however, the goods are to be used under cover, and not exposed to any such wear and tear, the other systems given may do well enough, although some of them may dust off.

(This is the last of a series of five articles on this subject by Mr. Nanson.—Editor.)

Locke Hydraulic Damper Regulator.

In the power plant a constant, even steam pressure is important in order to get the highest degree of efficiency. An even boiler pressure requires less coal, produces a more uniform speed of the engine, reduces wear and tear on the boiler, prolongs the life of grate bars, reduces the accident liability, and requires less time and attention. The accompanying illustration shows the Locke hydraulic damper



regulator, manufactured by the Locke Regulator Co., Salem, Mass. This is actuated by water under pressure admitted to the damper operating motor 19 through the valve 11, which in turn is made to open and close by the fluctuation of boiler pressure as it acts under the diaphragm 5, moving the weighted lever 1, to which the spindle of the valve 11 is attached. The cut-off attachment 14 prevents the full stroke of the damper.

The annual meeting of the American Cotton Manufacturers' Association will be held on Tuesday and Wednesday, May 27 and 28, at the Traymore Hotel, Atlantic City, N. J., it is announced by Secretary Winston D. Adams, of Charlotte. Further details will be given out later.

A Study of the Mill Power Plant

BY MILES SAMPSON.

In these days of mounting costs and increasingly keen competition it is a rare textile mill executive who is not paying more and more attention to his costs of producing steam and power.

He used to regard his coal bill as an uncontrollable factor, a necessary evil. The fireman who shoveled his coal was allowed to do so in his own way, with no guides except his steam and water gauges. The engine, driving the mill with its huge belts was generally well kept externally, though it was seldom indicated and little was known of its internal condition and its economy.

With the increased amount of consideration being given to these conditions it is undoubtedly true that much has been done in the last ten years to improve existing mill power plants and their operation. The fuel conservation program incident to war-time operation awoke many plant managers to a sense of their deficiencies, and some of the impetus undoubtedly persists to the present time.

There are, however, in the older cotton manufacturing centers, many compound or triple condensing engines of the Corliss or McIntosh-Seymour type installed twenty, thirty or more years ago. They may be considered fairly well operated, up to the limit of their inherent efficiency with pressures up to 150 pounds and a vacuum of 26 or 27 inches of mercury. This paper, however, is devoted to the economic possibilities involved in scrapping these old-time textile mill steam engine plants, and in replacing them with more economical plants, driving all machinery by motor. The consideration is necessarily broad and general, individual cases and conditions would require special study. It is believed, however, that it will be interesting to plant engineers and executives in view of the claims now being pushed as to the economy of engines of the Diesel type for textile mill work.

For the purposes of this discussion a print cloth mill is assumed of 80,000 spindles and 2,000 looms operating 48 hours weekly. Such a mill would require approximately 2,500 horsepower at the switchboard or at the engine shaft. Oil, of 14 degrees Baume gravity, costing $1.50 per barrel of 42 gallons, is to be used as fuel under boilers and in the Diesel engines. Proposed plants with a single prime mover of each type, large enough to drive the entire mill, are considered, and a three unit Diesel plant in addition.

The basis of comparison is taken to be a cost per brake horsepower hour in the old engine plant of $0.0177. Operating 52 weeks per annum at a load of 2,500 brake horsepower the yearly output would be 6,230,000 brake horsepower hours, and the total annual operating charges $110,000. This unit cost is an average for 13 mills of comparable size, and includes interest, taxes and depreciation.

The equivalent proposed electric plants must generate 2,500 horsepower at the switchboard, equal to approximately 1,865 kilowatts, or 1,900 kilowatts including excitation. On the same basis as above, the yearly output would be 4,750,000 kilowatt hours gross, or 4,640,000 net, excluding excitation.

Let us first assume that such an old engine plant is to be replaced by a modern steam turbo-generator plant, with complete motor drive (group, except pickers) for the machinery, estimating the cost and savings.

The boiler room should contain three 300 horsepower water-tube boilers, with two operating regularly at about 183 per cent rating, 200 pounds pressure and 100 degrees superheat. The turbo-generator would be of 2,000 kilowatt size, 3,600 revolutions per minute, operating at 28 inches to 28½ inches vacuum.

The necessary investment would be:

Land	Assume a nominal figure		$ 5,000
Buildings	Boiler house with chimney @ $33 H. P.	$29,700	
	Turbine house @ $9.25 K. W.	18,500	48,200
Equipment	Boilers, set, @ $45 H. P.	$40,500	
	Storage, 80,000 gals. (4 wks. supply)	8,000	
	Other equipment @ $27 H. P.	24,300	
	Turbo-generator, set, @ $24 K. W.	48,000	
	Condenser, piping, etc., @ $10 K. W.	20,000	
	Exciter, switchboard, etc., @ $10 K. W.	20,000	
	Motorizing 2500 H. P. @ $20 H. P.	50,000	210,800
Expense	Rearrangement of shafting, etc.		10,000
Total Investment			$274,000

The annual operating charges would be:

Interest	Investment $274,000 @ 6%		$16,440
Depreciation	Buildings $48,200 @ 1¼% =	$ 600	
	Boilers, etc. 72,800 @ 5% =	3640	
	Turbines, etc. 72,800 @ 3% =	2640	
	Motors, etc. 50,000 @ 3% =	1500	8,380
Taxes	Rate $2.50 per $100 on ½ cost		3,300
Fuel Oil	Steam load per hour		
	Turbine, 1900 K. W. @ 15 lbs. per K. W. H.	28,500 lbs.	
	Auxiliaries, non-condensing	4,500	
		33,000 lbs.	
	Steam load per year: 33,000 × 2496 hrs. × 1.10 = 90,700,000 lbs. 1.10 is an additional allowance for steam for heating and slashing.		
	Oil per year: 90,700,000 ÷ 4,600 = 19,700 bbls. @ $1.50		29,550
	4,600 = actual evaporation per bbl. of oil in a similar plant.		
Labor	4 day men, 1 night man @ $180 a week		9,360
Maintenance and Repairs	Steam plant $.0325 per 1000 lbs. steam	$2950	
	Motors $.50 per H. P. year	1250	4,200
Supplies	Steam plant $.01 per 1000 lbs steam		910
			$72,140

The estimated saving would be:

Annual operating charges, old engine plant	$110,000
Annual operating charges, new turbine plant	72,140
Annual saving	$37,860

$$\text{Per cent saving over interest charged} \frac{\$37,860}{274,000} = 13.7\%$$

Actual cost of power per net K. W. H. = $.0155

Let us next assume that the engine plant is to be replaced by a single unit Diesel engine plant, with direct connected generator and complete motor equipment.

The boiler room should retain the equivalent of two 150 horsepower boilers to furnish heating and slashing steam; one boiler operating regularly. They should be reset and equipped for oil firing. The engine would be of 3,000 kilowatt size, two cycle, with a 2,000 kilowatt alternator direct connected, and a belt driven exciter.

Considering both cash, and old equipment retained for use, the necessary investment would be:

Land	Assume a nominal figure----		$ 5,000
Buildings	Engine house ----------	$25,000	
	Boiler house and chimney ---	10,000—	35,000
Equipment	Engine, @ $60 H .P. --------	180,000	
	Alternator, @ $4.50 K. W.---	9,000	
	Exciter, @ $30 K. W.--------	750	
	Switchboard ----------	20,000	
	Oil storage, 33,000 gals.----	3,300	
	Freight, foundation and erection ----------	20,000	
	Motorizing 2500 H. P. @ $20 H. P. ----------	50,000	
	Boilers, reset and equipped for oil, with auxiliaries -----	10,000—	293,050
Expense	Rearrangement of shafting, etc. ----------		10,000
			$343,050

The annual operating charges would be:

Interest	Investment $343,000 @ 6%--------		$20,580
Depreciation	Buildings $35,000 @ 1¼%	$ 440	
	Boilers, etc. 10,000 @ 5%	500	
	Engines, etc. 233,000 @ 5%	11,650	
	Motors, etc. 50,000 @ 3%	1,500—	14,090
Taxes	$2.50 per $100.00 on half-cost-------		4,160
Fuel Oil	$\frac{4{,}750{,}000 \times 1.34 \times .48}{.93 \times 341}$ = 9640 bbls.		
	4,750,000 = gross K. W. H. per year.		
	1.34 = ratio H. P. H. to K. W. H.		
	.48 = lbs. oil per brake H. P. H.		
	.93 = generator efficiency.		
	341 = lbs. 14° oil per bbl.		
	Heating fuel = 9.1% × 19,700 bbls. = 1800 bbls.		
	19.700 = fuel for all steam plant.		
	9.1 = average heating and slashing requirements, 5% heating, 4.1% slashing.		
	Total fuel required, 11,440 bbls. @ $1.50 ----------		17,160
Labor	4 day men, 1 night man @ $180 a week ----------		9,360
Maintenance and Repairs	Engine and boilers @ 3% on engine cost ----------	$5,400	
	Motors @ $.50 per H. P. year ----------	1,250—	6,650
Supplies, Oil, etc.	At 1% on engine costs ----------		1,800
			$73,800

The estimated saving would be:

Annual operating charge, old engine plant------	$110,000
Annual operating charge, new Diesel plant------	73,800
Annual saving ----------	36,200

Per cent saving over interest $\frac{36{,}200}{343{,}000}$ = 10.6%

Actual cost of power per net K. W. H. = $.0159

Finally, let us calculate the costs when the new plant is made up of three equal Diesel engine units, with direct connected generators and complete motor equipment.

The boiler room equipment would be the same as for a single Diesel unit plant, the engines would be of 1,000 brake horsepower each, four cycle, direct connected to 700 kilowatt generators.

The investment would then be:

Land	Assume a nominal figure----		$ 5,000
Buildings	Engine house ----------	$30,000	
	Boiler house and chimney ---	10,000—	40,000
Equipment	3 engines, @ $73 H. P. ------	219,000	
	3 alternators, @ $5.00 K. W..	11,550	
	3 exciters, @ $30 K. W. ----	1,350	
	1 switchboard ----------	23,000	
	Oil storage, 33,000 gals.----	3,300	
	Freight, foundations, erection	30,000	
	Motorizing 2500 H. P. @ $20 H. P. ----------	50,000	
	Boilers, reset and equipped for oil, with auxiliaries -----	10,000—	348,200
Expense	Rearrangement of shafting, etc. ----------		10,000
			$403,200

The annual operating charges would be:

Interest	Investment $403,200 @ 6%--------		$24,190
Depreciation	Buildings $40,000 @ 1¼%	$ 500	
	Boilers, etc. 10,000 @ 5%	500	
	Engines, etc. 288,200 @ 5%	14,410	
	Motors, etc. 50,000 @ 3%	1,500—	16,910
Taxes	$2.50 per $100 on ½ cost----------		4,920
Fuel Oil	Same as for one unit plant, except a fuel efficiency of .45 lbs.		
	Oil for power $\frac{9640 \times .45}{.48}$ = 9040		
	Heating and slashing---- 1800		
	10,840 bbls.		16,260
Labor	4 day men, 1 night man at $180 a week ----------		9,360
Maintenance and Repairs	Engine, boilers, etc., @ 3% on engine cost ----------	$6570	
	Motors, @ $.50 per H. P. year ----------	1250—	7,820
Supplies, Oil etc.	At 1% on engine cost ----------		2,190
			$81,650

The estimated saving would be:

Annual operating charges, old engine plant------	$110,000
Annual operating charges, new Diesel plant------	81,650
Annual saving ----------	$28,350

Per cent saving over interest charged $\frac{\$28{,}350}{403{,}200}$ = 7.0%

Actual cost of power per net K. W. H. = $.0176

Let us present these results in a summarized form:

Plant	Investment Required	Annual Operating Charges	Annual Savings (Dollars)	Annual Savings Over Interest (Per cent)	Actual Cost per K. W. H.
Engine ------		$110,000			
Turbine -----	$274,000	72,140	$37,860	13.7.	.0155
Diesel—1 unit	343,000	73,800	36,200	10.6	.0159
Diesel—3 unit	403,200	81,650	28,350	7.0	.0176

Each alternate proposition showing a saving above interest on the necessary investment, no one project may be ruled out of consideration at once. A further discussion of the inherent advantages and disadvantages of the plants proposed, for the use herein considered, is here in order.

The mill executive today demands reliability in his power sources as never before. Production cannot be kept at a maximum without constant and never-failing power, and the steam engine met this condition admirably. The writer knows the record of one group of four such mill engines, of 1,500 to 3,000 horsepower. Over a period of 45 months, covering 36,850 engine hours, the mills were stopped only .065 per cent of the time due to engine trouble. (Belt troubles, during the same period, were responsible for about ⅝ as much stoppage.)

The turbine approaches the engine in reliability; the Diesel engine, apparently, does not. The power require-

ments of a print cloth mill are ideal for a Diesel engine. A steady and constant load for 48 hours weekly, leaves ample time for the inspections and renewals which are frequently necessary. The records available, however, do not approach that quoted above for steam engines. The three unit plant is insured against complete shutdown, and is, by so much, more reliable than any single unit plant. A four-unit Diesel plant would have fixed charges so high as to almost wipe out any possible saving.

The Diesel engine may be started and put under load very quickly, but has practically no overload capacity. Neither attribute is of particular moment in this case, for the loads can be accurately estimated, and the prime movers selected and operated to meet them.

At least three factors may enter to change the relative figures obtained. (1) Condensing and cooling water costs have not been considered here; if costs are high, or cold water is not cheaply available the Diesel engine may be at a decided advantage. (2) The Diesel has probably the highest heat efficiency of any prime mover in commercial operation, hence where fuel costs are high it holds an advantage. The following table of annual operating charges will illustrate the effect of high priced fuel:

Plant	$1.50 Oil	$2.00 Oil	$2.50 Oil
Turbine	$72,140	$81,990	$91,840
Diesel—1 unit	73,800	79,520	85,240
Diesel—3 unit	81,650	87,070	92,490

(3) Heavy uses for low pressure steam, beyond slashing and heating of buildings, will operate to the decided advantage of the steam turbine plant. The needs of a bleaching, dyeing or finishing department along these lines, may furnish a very strong reason for a turbine installation of the extraction or non-condensing types.

A still further factor may be noted: namely, an engine in good condition, regardless of its reasonable age, may be susceptible of very economical combination with a low pressure turbine, three conditions obtaining:

(1) The engine should be capable of non-condensing operation with a back pressure just above atmospheric.

(2) There must be a demand for additional electric power. The total output of the combination may be double that of the engine, but the turbine must in general deliver electric power due to its high speed.

(3) There must be an ample supply of cold condensing water, to successfully utilize the high vacuum economy of the turbine.

The figures obtained tend to show that in this case, where the conditions mentioned are assumed not to be present, an attractive saving can be made in discarding an old engine in textile mill work, and substituting a modern power plant with complete motor drive equipment. The most attractive saving appears to be made by the turbine plant, and it has much the greater reliability in comparison with the single unit Diesel plant.

The economy of the Diesel type engine is undoubted, yet often overstated. Bulletin 156 of the Bureau of Mines, for example, quotes 6,900 B.t.u. per brake horsepower hour for the heat efficiency of a 1,000 horsepower unit. This is nine per cent lower than the guaranteed test efficiency of a 1,000 horsepower four-cycle unit of one of the best makes of engines. The cost of equipment is often understated. The same bulletin gives $117 per kilowatt for a station with three 750 kilowatt units. Price quoted in 1923 for this size unit, by one of the best makers, was $116 per kilowatt for the bare engine, f. o. b. the works. It is also important to include in all cases the fixed charges of interest, depreciation and taxes, which exert a very appreciable effect in a proper comparison. It is only by a careful and painstaking study of actual costs and economies that such a comparison may be made.

C. R. MITCHELL has been made manager of the new southern branch of J. E. Rhoads & Sons, recently opened at 68 South Forsyth St., Atlanta, Ga., where a complete stock of the company's various brands of leather belting will be carried. This branch will serve as a distributing point for the Carolinas, Georgia, Florida, Alabama, Tennessee, Mississippi, Louisiana, Arkansas and Texas. The establishment of this branch by the Rhoads company is an evidence of their own growth, and shows as well their confidence in southern progress and business in textiles and other industries.

J. W. Mitchell will continue to cover Tennessee, Alabama, Arkansas, Texas and Louisiana, and S. E. Neely will call upon the trade in South Georgia, Florida, and South Carolina, and parts of Alabama. H. C. Petree will assist Mr. Mitchell in the Atlanta headquarters.

The Foxboro Co., Inc., Foxboro, Mass., have just issued a catalog which furnishes information concerning the various types of indicating, recording and controlling instruments made under the Foxboro trade-mark. This is known as Bulletin 96-1, and is the second general catalog that the company has produced.

Of value to those interested in testing is a new pamphlet containing the methods of testing, definitions of terms and specifications for textile materials as developed by the American Society for Testing Materials, and a selection from reports and papers relating thereto that have appeared in the society's proceedings. It is published for the purpose of presenting in a single cover data of the nature indicated that the society believes to be of much importance to all who deal with textile materials.

The pamphlet was prepared under the supervision of the society's Committee D-13 on Textile Materials, which was organized in 1914 to concern itself with methods of testing cotton fabrics, and which has served a most useful purpose, most of the major activities of the committee being presented in this pamphlet in the form of reports. Copies of the pamphlet may be procured from the American Society for Testing Materials, 1315 Spruce St., Philadelphia, at the following prices: single copies, $1.00; lots of 25 to 99, 50 cents each; lots of 100 to 249, 40 cents each; lots of 250 and above, 30 cents each.

Towels and Toweling

BY T. WOODHOUSE AND A. BRAND.

Combination Twill and Other Stripes.

A comparatively large and most interesting class of toweling fabrics—particularly roller or crash toweling—has its weave structure composed of stripes, each stripe made up of distinct weaves, but all the weaves in any one fabric definitely related in some particular manner. Occasionally the only feature in common is that all the weaves employed are on the same number of harnesses, or, to put the case more generally and more correctly, the number of harnesses employed is the same whether one weave or two or more weaves are used in the manufacture of any particular cloth, and the total number of picks is the least common multiple of the numbers of picks in each component weave. More often the various stripes have a weaving plan common to all, and the variety in weave structure is produced by metaphorically "ringing the changes"

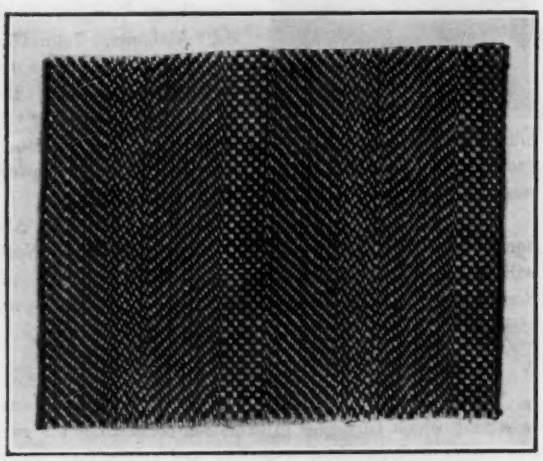


FIG. 32.

in the draft, i.e., altering the draft for each different stripe in the repeat of the design.

A simple but typical example of this latter class is illustrated in Fig. 32. The original of this reproduction is woven with a single white flax tow warp and a 2-fold Turkey-red cotton filling, and has 44 threads per inch and about 46 picks per inch, i.e., an approximately "square" fabric. Two complete units of the full point-paper design in the way of the filling are shown at F, Fig. 33, one in solid black squares and the other in crosses. It will be seen that the complete design is made up as follows:

4-harness broken or semi-sateen weave	6 threads
2 up 2 down twill to left	24 threads
4-harness (thread) basket or hopsack	16 threads
2 up 2 down twill to right	24 threads
4-harness broken twill	7 threads
Total	77 threads

The complete pattern is thus composed of 77 threads and 4 picks, and can be woven on 4 harnesses with either weaving plan K and its corresponding draft G, or, preferably, with the weaving plan J and its corresponding draft H. Both these weaving plans and drafts are shown in Fig. 33. The weaving plans J and K may also be regarded as simple units of the 4-thread broken twill and the 2 up 2 down twill to right respectively. The unit at L, Fig. 33, is that of the 4-thread 4-pick basket or hopsack weave, sometimes termed the 4-thread regular hopsack, while the remaining unit used in the construction of the complete pattern F is the opposite hand twill to that shown at K.

It might be surmised from the construction of the complete weave F that it could be made complete on some multiple of 4 threads; it is actually complete on one more thread than a complete multiple of 4 threads, for $77 = (19 \times 4) + 1 = 76 + 1$. But a close examination of the weave F will reveal that the last thread of one section and the first thread of the succeeding section are invariably cutting threads. See the 6th and 7th threads, the 30th and 31st, the 46th and 47th, and the 70th and 71st, counting from the left in design F, Fig. 33. This use of cutting threads is essential if the distinctness of the various weaves is to be preserved, if clear cut effects are to be obtained, and if the length of the float is to be kept at a minimum. In the present case, all the floats are over two picks, and for the most part over two threads; any other arrangement will result in a faulty joining of two different weaves, and a length of float equal to at least three threads and picks. In

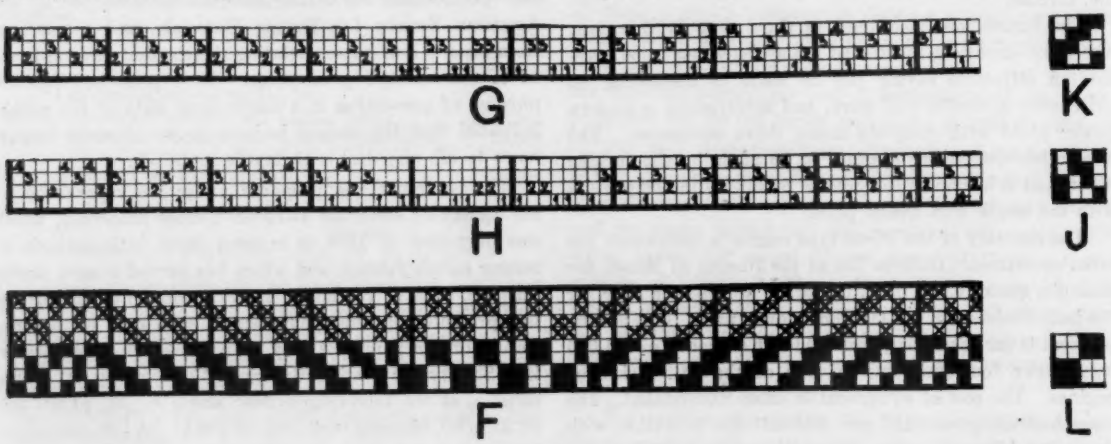


FIG. 33.

the present sett of fabric, a float of three cannot be pronounced unduly long, but the presence of such floats would probably render the junction of two different weaves somewhat obscure, and detract from the smartness of the stripe effect.

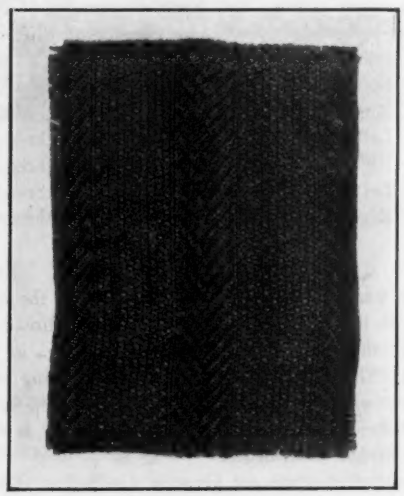


FIG. 34.

Draft H and weaving plan J are to be preferred to the others illustrated in Fig. 33 for at least two reasons—

(1) The two front harnesses carry the largest proportion of the threads, and are nearest to the weaver, i.e., in a position to facilitate the repair of broken threads.

(2) Oppositely interlacing threads are on adjacent harnesses, and the cloth therefore could be woven readily in a negative tappet loom with the aid of two plain top rollers.

Another typical example is illustrated in Fig. 34, the original of which, woven for sample purposes only, is in green mercerized 2-fold cotton, with about 50 threads per inch. It exhibits a bold arrow-head (herring-bone) warp plush twill stripe on a gauze-like ground, and two complete units in the way of the warp are shown. The twill weave is the 5 up 1 down warp flush, of which one complete unit is shown at P, Fig. 35, and which obviously requires 6 harnesses. The gauze-like structure is obtained by the 6-thread imitation gauze weave; one complete unit of this weave is given at N, Fig. 35, and, although one so-called repeat is on 6 threads and 6 picks, the design can be woven with 4 harnesses. Neither of the component waves has a thread which is similar to any thread in the other weave, and hence the complete fabric requires a minimum of 6 + 4 = 10 harnesses.

The complete design contains 68 threads and 6 picks, the threads being employed as follows:

18 threads for imitation gauze
16 threads for left-hand twill
16 threads for right-hand twill
18 threads for imitation gauze

68 threads per repeat.

The point-paper design at M, Fig. 35, shows 96 threads and 12 picks; one set of 6 picks is in solid black squares, and the other set is in crosses. One repeat in the way of the warp is contained between the arrow-heads immediately underneath the design M. The fabric could be produced

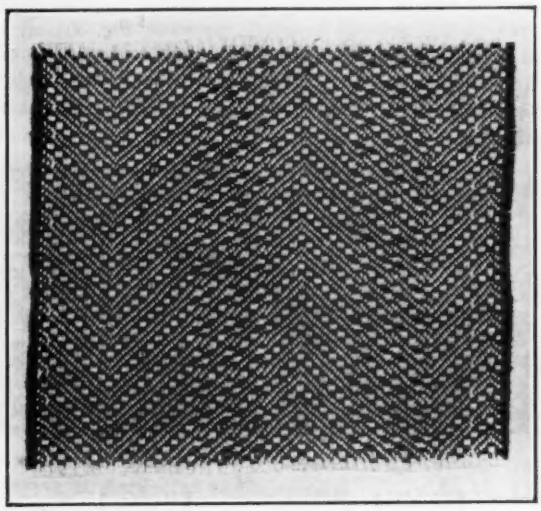


FIG. 36.

with the weaving plan Q, in conjunction with the draft R.

The imitation gauze weave in Fig. 35 could be drafted as follows: 2-1-2-3-4-3, which is rather simpler than the one shown. The reader is advised to try this draft in conjunction with the remainder on the harnesses 5 to 10, and to make the corresponding weaving plan.

It is, however, quite possible and probable that 12 harnesses would be used for the above design. And if 12 harnesses were used, the front six would be used for the twill weaves, while the complete draft would be much more simple in its numerical arrangement.

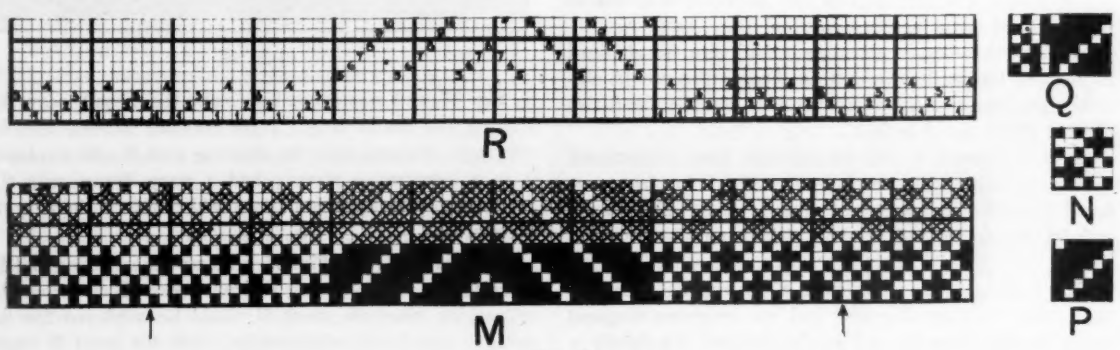


FIG. 35.

The gauze-like effect is a characteristic of the weave N, produced partly by variation in the take-up of the warp threads during weaving, and partly by the relation of the floats to the plain weave section, and considerably emphasized by the correct order of reeding in threes, with two similar plain threads and a floating thread in one dent or split. This method of reeding is essential. It may be mentioned in passing that in extreme cases of variation in take-up, it is a wise plan, in general, to put the plain weaving threads on a separate beam.

As a towel fabric, the sample in Fig. 34 could be improved by using an equally-floated twill, preferably with an odd number of picks in the warp float. The 3 up 3 down twill is the only other regular twill which satisfies these conditions, and if it were employed, it would be possible to reduce the number of harnesses necessary by two, because two of the threads of the imitation gauze weave (see the 2nd and 5th threads in weave N, Fig. 35) are of the same order of weaving as two of the threads of the 3 up 3 down twill.

Equal floats in the twill insure an equality in the amount of warp and filling on the fabric surfaces, while odd-numbered floats are an advantage when joining up to the 6-thread imitation gauze. The use of the 3 up 3 down twill would render the twill stripe less prominent, but it would reduce the length of the maximum float of filling, which in the design M, Fig. 35, is one of 9 (See the fourth pick from the bottom). The reduction of this float length would be an undoubted advantage in fabrics of coarse sett.

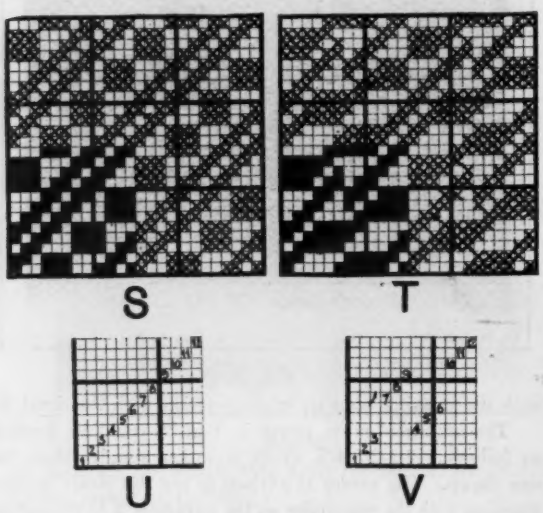


FIG. 37.

An improvement in structure would also be obtained by turning the twill on a cutting thread; this would also reduce the length of the maximum float, but the distinctive chevron effect would be lost.

A third example on slightly different lines is illustrated by the specially woven sample in Fig. 36. It has been produced from 2-fold mercerized cotton yarns; white warp with 50 threads per inch, and 52 picks per inch of maroon filling.

The weave may be regarded as a combination of a regular fancy twill or diagonal and an irregular diagonal weave derived from it, and in this respect, the fabric is constructed on a principle similar to that illustrated in Fig. 32. Indeed, the chief difference lies in the comparative elaboration of the unit weave, four repeats of which are shown at S, Fig. 37.

The irregular diagonal weave which is used in conjunction with the regular variety is shown at T, Fig. 37, four repeats being given. The complete pattern of the fabric occupies a comparatively large number of threads, and is arranged in the following order:

Left-hand variety of unit S	= 27 threads
Right-hand variety of unit T	= 27 threads
Left-hand variety of unit S	= 15 threads
Right-hand variety of unit S	= 15 threads
Left-hand variety of unit T	= 27 threads
Right-hand variety of unit S	= 27 threads
	138 in all

The weave T in Fig. 37 is made from the other unit weave S by arranging the blocks of 3 threads and 12 picks in the 4-thread broken twill order, i.e., in the order 1-3-2-4. The weave S may be regarded as being in 4-thread straight twill order with respect to the warp-flush blocks of 3 threads and 12 picks, and the weave T is thus in 4-thread broken twill order.

Each of the weaves gives a distinctive effect where used alone, but the combination is not very successful. Herein is an example of a common difficulty often met with by fabric designers. The component weave may look suitable enough when viewed on design paper, but the effect in the actual fabric may be quite different from what was originally expected. In the present case, it is probable that the designer worked solely from the weave S, Fig. 37, and was content to make the second weave by altering the drafts only. It is possible, indeed, that he may have designed only the weaving plan S and employed it in a loom which already had a warp drawn with the appropriate draft for a pattern which was perhaps quite successful.

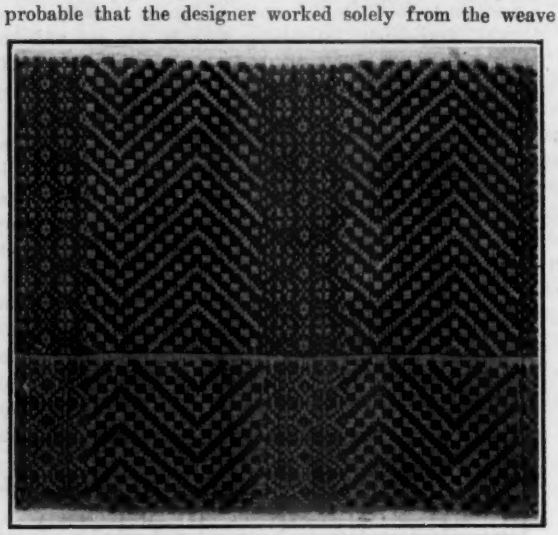


FIG. 38.

The unit weave S, Fig. 37, requires 12 harnesses and 12 picks to the round. Using the unit weave S as a weaving or pegging plan, the draft U would be employed for the straight right-hand twill portions, while the draft V would have to be utilized for all portions corresponding to the

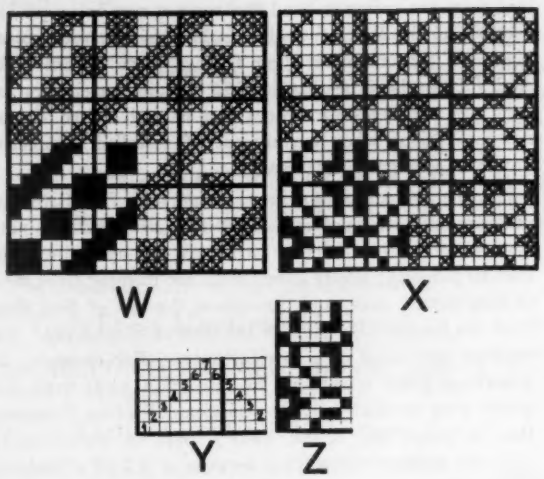


FIG. 39.

weave T.

A further example, on slightly different lines—inasmuch as it is a combination of a fancy twill weave and an irregular diamond figure—is illustrated in Fig. 38. A small portion at the bottom of the sample is turned over to exhibit the back. It will be understood, of course, that the terms "face" and "back" are used relatively only; the face side in general is that which is uppermost in the loom during the weaving process, and in all cases it is the one which is considered the better side where any difference exists.

The unit weaves for Fig. 38 appear at W and X, Fig. 39. Each is complete on 12 threads and 12 picks. Weave W requires 12 harnesses, while weave X requires 7 other harnesses. If weave X were woven alone, it could be produced by weaving plan or peg plan Y along with the draft Z.

The unit weave W, Fig. 39, is another variation of the basket or hopsack effect on a twill ground, while the diamond weave X is an attempt—not very successful—to obtain an ogee effect. The ogee effect is a comparative failure, because of the small floats forming the characteristic outline.

The structure is somewhat loose for a towel fabric, and long warp floats of 7 are produced on the back of the fabric; these may be seen readily in the lower or doubled over part of Fig. 38, and are produced on the 4th and 10th threads (counting from the left) of weave X, Fig. 39. These long floats could be stopped, and a somewhat firmer structure produced by adding an extra mark to the 4th

(*Continued on page* 423.)

What the Southern Mills are Doing

New construction and expansion news from the southern textile industry is somewhat slight for January in comparison with recent months, though a number of items of interest came to light during the period.

In South Carolina, the Woodside Mills at Greenville announced the letting of a contract for erecting 50 new dwelling houses in the village. This is in addition to the 25 new cottages previously announced, and the total of 75 houses represent an expenditure of around $112,000. All these houses are of the four-room, single-story type, equipped with running water, sewage facilities and electric lights.

A new two-story weave room, 108 x 160 feet, is to be built by the Lancaster Cotton Mills, at Lancaster, S. C., for housing 400 looms. J. E. Sirrine & Company, Greenville, are the engineers.

Report during the month stated that the Chamber of Commerce at Greenwood, S. C., is negotiating with a large New England textile manufacturing concern for the establishment of a plant at that place. The plan being that the company shall furnish the machinery, with the company being formed locally.

The Charles M. London Co., operating a plant at Enfield, Mass., have acquired a building at Sumter, S. C., and will transfer machinery from the eastern plant for the manufacture of a trousering material, using a mixture of woolen and cotton yarns, the mill to purchase the latter.

A yarn mill will be built by the Blue Ridge Mills, Landrum, S. C., in addition to the present plant, it is announced.

At the directors' meeting of the Burlington Mills, Inc., Burlington, N. C., it was voted to let the contract for building, warehouses, village houses, etc., for the new mill to the Gaston Construction Company, Gastonia, N. C. The main building will be 570 feet long daylight construction. Work will be started at once and contract calls for completion by June 1.

Production was recently begun in the new addition to the Bladenboro Cotton Mills, Bladenboro, N. C., for the production of fine and medium count carded yarns. The equipment consists of 15,000 spindles.

Work is about completed at the new plant of the Hobarton Mfg. Co., Concord, N. C., for which Lockwood, Greene & Co. are the engineers.

The Fine Fabrics Factories, Inc., is the name of a new textile concern incorporated at Asheville, N. C. The company, with a capital stock of $250,000, is authorized to manufacture cotton, linen and flax fabrics and threads. H. C. Dangerfield, R. W. Chambers, and T. M. McNeil are the incorporators.

The Rhodes-Rhyne Mfg. Company, Lincolnton, N. C., are installing 100 new Crompton & Knowles broad looms and expect to have them in operation by March, it is stated.

The Lois Cotton Mills, at Douglasville, Ga., were recently purchased by the Beaver Duck Mills, of North Adams, Mass., and will be operated as a plant of that organization. The Douglasville mills contain 21,760 spindles and 520 looms on print cloths, and the purchase price was understood to be approximately $1,250,000.

The new 5,000 spindle addition to the plant of the Habersham Mills, Habersham, Ga., is nearing completion, and according to report, further expansion is contemplated.

The Gate City Cotton Mills, College Park, Ga., of which Lee M. Jordan is the president, have acquired a substantial interest in the Cartersville Mills, Cartersville, Ga., underwear manufacturers. The same organization will remain practically intact.

William G. Broadfoot, 168 The Prado, Atlanta, who re-

cently became president of Roswell Mills, Inc., the new corporation which acquired the property and assets of the Roswell Manufacturing Company, at Roswell, Ga., has secured a large interest in the Marcella Cotton Mfg. Co., Eufaula, Ala., and will, according to report, extend this mill's productive capacity by the installation of additional spinning and weaving machinery some time in the near future. Improvement work is also being carried on at the Roswell plant, where Mr. Broadfoot will maintain headquarters.

It is reported that a 10,000 spindle cotton mill will be erected at Omaha, Texas. Col. Milton Farris is interested.

The Marble Falls Textile Co., Marble Falls, Texas, will erect a new mill to be equipped with 10,000 spindles. Plans are being prepared by M. H. Merrill & Co., of Boston.

Incorporation papers for the Pennsylvania Yarn Mills, Central Falls, N. C., have been issued. The concern is authorized a capitalization of $350,000. The incorporators are C. J. Cox, Greensboro; I. N. Cox, Central Falls, and Carter Dalton, High Point.

The Rockford Mills, Rockford, Tenn., are building an addition to their plant.

The Appalachian Mills, at Knoxville, Tenn., have plans for the erection of a dyehouse. The new building will be located on the site of the previous one, twice its size. It will be a brick building, one-story, with steel sash, steel truss and new equipment throughout.

Plans for the erection of a $500,000 yarn and thread mill at Memphis, Tenn., have been announced by Oscar F. Stetson, of the French Thread Mills, of Warren, R. I., and the Dean Thread Corporation, of Detroit. Mr. Stetson is planning to remodel the Romac Cotton Mills, and install spinning machinery, and later to add another plant, in which 30,000 spindles will be installed.

The Pacific Shade Cloth Co., Oakland, Cal., has awarded contract for the erection of a one-story brick mill, to cost approximately $25,000.

It has been announced that the summer meeting of the Southern Textile Association will be held at the Mayview Hotel, at Blowing Rock, N. C., in June, the 13th and 14th being the tentative dates set by President James A. Chapman, Jr., of Inman, S. C. The members of the association and their friends recall the pleasant meeting held in the North Carolina mountains last summer, and are looking forward to a most successful affair this year.

The New England Mill Situation.

One of the significant facts of the New England mill situation, and indeed that of the whole cotton industry, is that cotton machinery concerns have begun operating on short time and with contracted working forces. Investment is large in many directions but new money is not forthcoming for more spindles, cards, and looms. Provision has been made for construction of new finishing plants in the South, and there may be in the near future, some further transference of New England cotton mill machinery south. But when the machine shops are shutting down it is prima facie evidence that profits are narrowing very fast in the industry.

The Saco-Lowell shops are running four days a week, and some of the other large shops are running three or four days with limited numbers of workers. It is believed that there are orders in hand that are not now being pushed because of the lack of profit in the business with cotton high and consumers resisting further price advances for cloth. It is also true that costs of building machinery are very high and investors are not keen at such a time to push new operations when curtailment of installed productive power is constantly discussed.

At the present time print cloth mills in Fall River are not running to 50 per cent capacity. New Bedford mills engaged on plain cloths or yarns are not operating more than 65 per cent; Rhode Island mills are running from three to four days a week, and throughout the rest of New England the tendency to restrict the output is growing. Exceptions are noted in a few instances. For example, the Amoskeag plant is running in full again while some machines were re-started in the American Printing Company. But in Maine and in the western part of Massachusetts mills are gradually curtailing because of a lack of orders.

Conditions as to the volume of output in a given center vary greatly. In Fall River, for example, there are some mills running in full with full complements of workers, while hardly three blocks away mills equipped for the production of cotton goods are idle. The explanation is that the goods made in one mill are either fancies or specialties, while in the idle mills only goods of a staple character are produced. An instance cited in Fall River this week is typical. The Ancona Company is a plant of about 40,000 spindles and 1,000 looms. The original mill buildings were erected in the early '70s when the corporation owning them were known as the Slade Mills, and the chief product was 28 inch 64 x 64 print cloths.

During the past year the single owner of the property has expended fully $800,000 in re-equipping the property with new spinning, cards, dobby automatic looms, and every known improvement for the lightening of the cleaning processes about the plants. Some manufacturers have looked upon the venture as ill advised, but the fact is that the plant is today running in full on fancy handkerchief work and many novelties and making money while plants nearby are idle and losing money. There are some mills in New Bedford that have been running in full for months while other mills have been running part of their machinery. The explanation is that in the one case, novelties in silk and cottons or fancy yarn dyed cottons are being made, while in the other the machinery awaits orders for plain very fine combed yarn cloths that are not selling in the gray nor converted state, on a profitable basis.

During the past three months there has been much changing over of New England machinery for the production of new types of cloths. The Bates Mfg. Co., of Maine, one of the oldest makers of bedspreads and colored damasks, is now busy making novelties in crinkled striped designs of art silk and cotton cloths for bedspreads and can sell more than it can deliver promptly.

Instead of diversifying its product of late, making dozens of sorts of ginghams, the Amoskeag Company has offered and sold very freely a line of 32-inch ginghams and chambrays, highly styled, and offered in many weaves and color designs never before attempted. It is also finding work on substantial quantities of special cloths for a wide variety of uses in the converting trades.

These things all mean that New England is finally facing the hard conditions confronting her and going into

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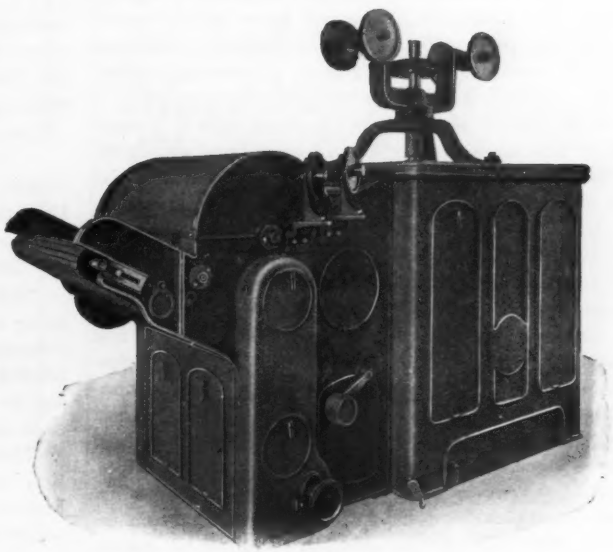

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lines of merchandise the market will take and which are not readily duplicated elsewhere, or which, if duplicated, are not brought on the markets in time to sell profitably.

One of the impressive facts of the market conditions that affect New England was brought out in a meeting of dry goods wholesalers in New York in the week of January 14. The assembled jobbers were convinced that consumers are going to resist higher prices for goods, not only in cotton, but in wool, silk, and other textile lines. They so notified selling agents individually and collectively, and in turn the news reached cotton manufacturers. When new prices were named on napped cottons by the Amoskeag Company, and later in the week followed by other concerns, the prices current last year were again named, although cotton was from five to six cents a pound lower in 1923 January than when the new price basis was established.

In addition, the Pacific mills, now the largest bleachers in the country, named a reduced price on 4-4 bleached muslins, going down ½ cent a yard from the top figure of 12¾ cents for 4-4 64 x 60s. This action was taken following the decline in gray cloths which had been going on for some time. Other facts in this connection were the naming of old prices on some of the wash fabrics, and a reduction of 2 cents a yard in narrow staple ginghams.

New England manufacturers as a whole are reconciled to a light business during the balance of the cotton crop year. Some of them say very frankly that their chief problem today is not what they may make, but how to prevent serious losses. A combination of circumstances has arisen that has changed the views entertained some time ago of what the industry may have to go through.

It is contended that cotton goods, being relatively higher in cost this year than other textiles, will suffer most from a species of economy that has already set in and affects all textiles. These circumstances are so numerous that an opportunity will not be afforded to test out satisfactorily to what extent cloth consumption may be relied upon when cotton is above 30 cents a pound.

It has been shown that no economy is being practiced in the purchase of autos, washing machines, and radio outfits. But need for paying for these goods leads the buyers to look about where they may find spots for the practice of so-called economy and they naturally turn to either jewelry or dry goods. And the dry goods that are hurt first are not the extravagant and styled novelties and specialties, but the common standard goods such as percales, ginghams, etc. Experienced cotton manufacturers say this has always been the course of the market when economy set in, either following panics, or when buying power for some special purpose has been reduced.

Manufacturers who think in this way say that they are ready to agree that the country is generally prosperous, that labor is well employed, that political conditions are relatively good compared with any other spot on God's footstool, that savings banks deposits are large, etc., etc., and to any other thing that is believed to show that the purchasing power of the country is abundant. But after agreeing to this they point out that mills are curtailing because of a lack of orders and at a time when prices current in primary markets have not yet even reached the jobber in full force, to say nothing of the retailer.

For four or five weeks the most astonishing phase of the

cotton mill situation to many manufacturers was that there was no market demand for goods at any price. Some of them made efforts to get bids for goods they wished to sell and were not even rewarded by a response to a cut price. They found buyers unwilling to operate at any price. That is the feature of the situation that has set many men thinking. It can only be explained in full by an acceptance of the theory of economy that is being practiced at the expense of cottons and other textiles, in order to supply money for the purchase of the new means of enjoyment, such as radio, automobiling, or the new means of lightening labors in the home by the purchase of electrical devices of many sorts.

While idleness seems assured in many mills it is noteworthy that there is a degree of cheerfulness manifested by manufacturers of late arising probably from the belief that ultimately the change that has come will prevent any accumulation of high priced goods in the retail and distributing channels of trade. That will mean that if cotton again becomes relatively cheap there will be a real need for goods and a real power to buy them.

The financial pressure is naturally increasing in mill centers. Early this month, creditors took hold of the Seaconnet Mills of Fall River and prepared for a reorganization of some sort, the indebtedness being in excess of half a million dollars. Some other mills are known to be hard pressed because of the poor returns from a limited output.

The fine yarn trade continues dull. There is more equipment than the market demand will take care of and spinners are devoting most of their attention to producing specialties of one kind or another. Staples show no profit.

Cotton Comment.

BY H. AND B. BEER.

New Orleans, January 18th, 1924.

During the better part of the past month, the tendency of the market has been downward, influenced to the lowest level this week reached on the downward movement, due mainly to failure of the demand for spots in the South and goods in the North to revive, also because of the unfavorable European political and economic situation.

There has been extensive liquidation of the speculative long interest on the scale down, and while the technical position is undoubtedly healthier, there is not now the former desire to buy cotton for an investment since the old crop is gradually coming within the shadow of prospects for the next crop.

If the market is to experience an important and permanent advance in the future, such a rise in values would likely have to come of a decidedly better demand for raw cotton or cotton goods or a prolonged spell of bad weather that would delay preparations for the new crop.

The following tables of figures show cotton marketed so far this season, the world takings of American cotton and the available supply exclusive of mill stocks:

COTTON MARKETED SO FAR THIS SEASON.

	This Season	Last Season
In sight for week	209,000	204,000
In sight since Jan. 1	603,000	596,000
In sight since Aug. 1	8,862,000	8,724,000

SPINNERS TAKINGS OF AMERICAN COTTON BY THE WORLD.

Since August 1st—	This Season	Last Season
Northern mills	1,125,000	1,607,000
Southern mills	2,807,000	2,957,000
Foreign mills	2,725,000	2,808,000
Mills of the world	6,657,000	7,372,000

WORLD'S VISIBLE SUPPLY OF ALL KINDS TODAY.

	This Year	Last Year
American	3,043,000	3,263,000
Other kinds	1,441,000	1,576,000
All kinds	4,484,000	4,839,000

WORLD'S AVAILABLE SUPPLY OF AMERICAN COTTON TODAY, EXCLUSIVE OF AMERICAN AND FOREIGN MILL STOCKS.

	This Year	Last Year
World's visible supply	3,043,000	3,263,000
Unmarketed, estimated	2,285,000	2,924,000
Total available	5,328,000	6,187,000

These deductions are based on the carry-over in the interior at the close of last season, plus the government's estimate for a yield of 10,081,000 bales and allowance of 650,000 bales for linters, the world's visible supply of today and the estimated amount of cotton remaining to be marketed in the South.

Therefore, the statistical position, present and prospective, insofar as this crop is concerned, is very bullish, which, however, is offset to some extent by the comparatively high prices prevailing, yet permit of bullish developments during the last half of the season in event of there being a revival of an urgent demand for the remnant of the old crop, or if anything should happen to mar prospects for the next crop.

In regard to the European demand, will say that until of late it has been urgent, which is reflected in the large exports from the United States thus far this season—3,620,000 bales vs. 3,034,000 to even date last season, or 586,000 bales in excess of last year.

DISTRIBUTION OF THE WORLD'S VISIBLE SUPPLY TODAY.

American Cotton—	This Year	Last Year
Liverpool stock	460,000	474,000
Manchester stock	73,000	49,000
Continental stock	284,000	460,000
Afloat from United States	500,000	349,000
U. S. ports stocks	933,000	952,000
U. S. interior stocks, 30 towns	793,000	979,000
World's visible of Amer. today	3,043,000	3,263,000

As to the outlook for the next crop, prospects are encouraging. The high price is an incentive to plant a record acreage and for a big increase in the use of fertilizer, while the recent severe cold weather in the cotton region, which was the coldest in many years in the Southwest and the Mississippi Valley, and the coldest in 25 years at Atlanta, Ga., gives hope that weevil will not be so numerous this year, and the December rainfall in Texas was the heaviest on record—5.52 inches vs. only 0.60 for December of last season, thereby placing a splendid season in the ground in that important state.

Southern Textile Association meeting, Mayview Park Hotel, Blowing Rock, N. C., June 13 and 14.

An Open Letter to MILL EXECUTIVES

Gentlemen:

We are absolutely sincere in our belief we can substantially cut your cost of cleaning roving bobbins or feeler bobbins.

Our belief is based on the fact that we already have substantially cut bobbin cleaning costs in literally hundreds of mills in the United States, Canada and foreign countries.

Mill executives who have installed our Termaco machines for cleaning roving bobbins, or our Utsman machines for cleaning feeler bobbins, not only report an important lowering of the cost of cleaning, but they report a greatly reduced cost for bobbins.

Bobbins cleaned by the Termaco or Utsman machines are not only cleaned more thoroughly, but they last longer.

Waste taken from the bobbins by the Termaco does not have to be reworked to take out the twist, and both the Termaco and Utsman remove waste without scattering it about the mill.

Our machines are simplicity, itself, to operate, and they are ruggedly constructed to give long, uninterrupted, always satisfactory service.

Cost of operation is so small as to be a negligible item—when compared with the savings made.

The Termaco cleans upwards of 30,000 roving bobbins each working day. The Single End Utsman cleans 40,000 feeler bobbins. The Double End Utsman cleans 80,000 feeler bobbins each working day.

Your mill may be the exception where we cannot substantially reduce bobbin cleaning costs. However, it costs you nothing nor puts you under the slightest obligation to learn the facts and actual figures.

Our Engineering Department will give you unbiased, exact information as to just what a Termaco or Utsman installation will accomplish in your own particular case.

Write us, stating whether you are interested in cleaning roving or feeler bobbins. We will send you data you will find of real interest.

Very truly yours,

Engineering Department,

THE TERRELL MACHINE CO.,

Charlotte, N. C.

P. S.—General Supply Co., Danielson, Conn., our representative for New York and New England, carries a complete stock of parts for the convenience of Northern mills. We are represented in South Carolina by E. S. Player, Masonic Temple, Greenville S. C.

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Notes About Men You Know.

A. FERGUSSON MACINTIRE, for the last several years agent of the Fulton Bag & Cotton Mills, Atlanta, Ga., has resigned, effective January 12th.

N. B. MURPHY has become superintendent of the Thomson, Ga., plant of The Lullwater Company, formerly the Couch Mills, Inc. Mr. Murphy was formerly assistant superintendent at the Shawmut (Ala.) Mill of the West Point Manufacturing Company.

J. R. CORLEY, formerly chief testing engineer at the testing laboratory of the West Point Manufacturing Company at Shawmut, Ala., has accepted the assistant superintendency of the Aragon Mills, at Aragon, Ga.

HUME EASTMAN has been promoted to the position of cashier at the Anchor Duck Mills, Rome, Ga., succeeding Albert Lehman, who has become superintendent of The Dixie Cotton Mills, LaGrange, Ga.

W. M. SHERARD, vice-president and general manager of the Glenn-Lowry Mfg. Company, Whitmire, S. C., has resigned, to become effective the first of March. It is understood that Mr. Sherard will reside in Hendersonville, N. C. He is one of the best known and most popular operating executives in the southern industry, being a past-president of the Southern Textile Association, in which organization he has always taken an active part.

C. D. GRAY was elected president of the Priscilla Spinning Co., Gastonia, N. C., to succeed J. H. Mayes, resigned. W. S. Buice was elected vice-president.

RICHARD H. FISH, superintendent of the Arkwright Mills, Fall River, Mass., who has tendered his resignation effective January 24th, plans to take a trip through the South in February. Mr. Fish has been with the Arkwright Mills for the past ten years. Previously he was assistant superintendent of the Durfee Mills, of Fall River.

It was erroneously stated in these columns in the December issue that L. W. Walter was overseer of spinning at the No. 1 Mill of Chadwick-Hoskins Co., Charlotte, N. C. James C. Hooks holds this position, we are informed, and we are glad to make this correction.

PEIRCE LEWIS has been appointed advertising and sales promotion manager of the Truscon Steel Company, and will have complete charge of this department which is now located at the home office and plant in Youngstown, Ohio. Mr. Lewis has had a wide experience in advertising and sales work, having been connected with Kawnee Mfg. Co., Detroit Steel Products Co., and as assistant advertising manager of the Truscon Steel Company.

WILLIAM P. CARGILL, superintendent of the Hermitage Cotton Mills, Camden, S. C., has resigned to accept the position of general superintendent of the American and McLain Cotton Mills, Bessemer City, N. C.

H. V. DEAVER has been promoted from overseer of carding to superintendent of the Maple Mills, Dillon, S. C.

C. J. ASHMORE has resigned as assistant superintendent of the Altavista Cotton Mills, Altavista, Va., to become superintendent of the Cascade Mills, Mooresville, N. C., it is reported.

C. G. VOSS, who recently resigned as superintendent of the Efird Mfg. Co., Albemarle, N. C., has accepted a similar position at the China Grove Cotton Mills, China Grove, N. C., succeeding W. P. Lee. S. T. Bennett returns to Efird to succeed Mr. Voss.

DEAVER LITTLE has resigned as superintendent of the Republic Cotton Mills, at Great Falls, S. C., it is reported, and is succeeded by Robert S. Mebane, Jr., son of the mill's president, who has been assistant superintendent for some time. Mr. Little's future plans were not announced.

W. H. TAYLOR has been made superintendent of the new weaving plant at the Republic Cotton Mills, Great Falls, S. C.

O. A. Sullivan has been promoted to assistant superintendent at the Gaffney Manufacturing Company, Gaffney, S. C., retaining also his position as overseer of carding.

M. M. BUSLEY has become overseer of carding at Adelaide Mills, Anniston, Ala.

H. E. SULLIVAN, formerly at Fairmont, S. C., has become overseer of weaving at the Gaffney Mfg. Co., Gaffney, S. C.

W. L. BRUCE has become overseer of cloth room at the Victor plant of the Victor-Monaghan Co., at Greer, S. C., succeeding J. J. Wham, who has accepted a similar position at the Greer plant of the company.

ARTHUR NANCE was recently made overseer of carding at the China Grove Cotton Mills, China Grove, N. C., succeeding R. C. Rice who is now overseer of carding at the Bladenboro Cotton Mills, Bladenboro, N. C.

WILLIAM E. BEATTIE, president of the American Cotton Manufacturers Association, and Mrs. Beattie, are enjoying a tour of Europe, having sailed from New York on January 19th. They will spend several weeks in Europe, principally in the Mediterranean countries and will return to America late in March.

J. T. SMYLIE has been made cashier at the Milstead Mfg. Company, Milstead, Ga., succeeding J. H. Hannah, who recently resigned.

GEORGE W. BROWN has become superintendent of the Sweetwater Hosiery Mills, Sweetwater, Tenn.

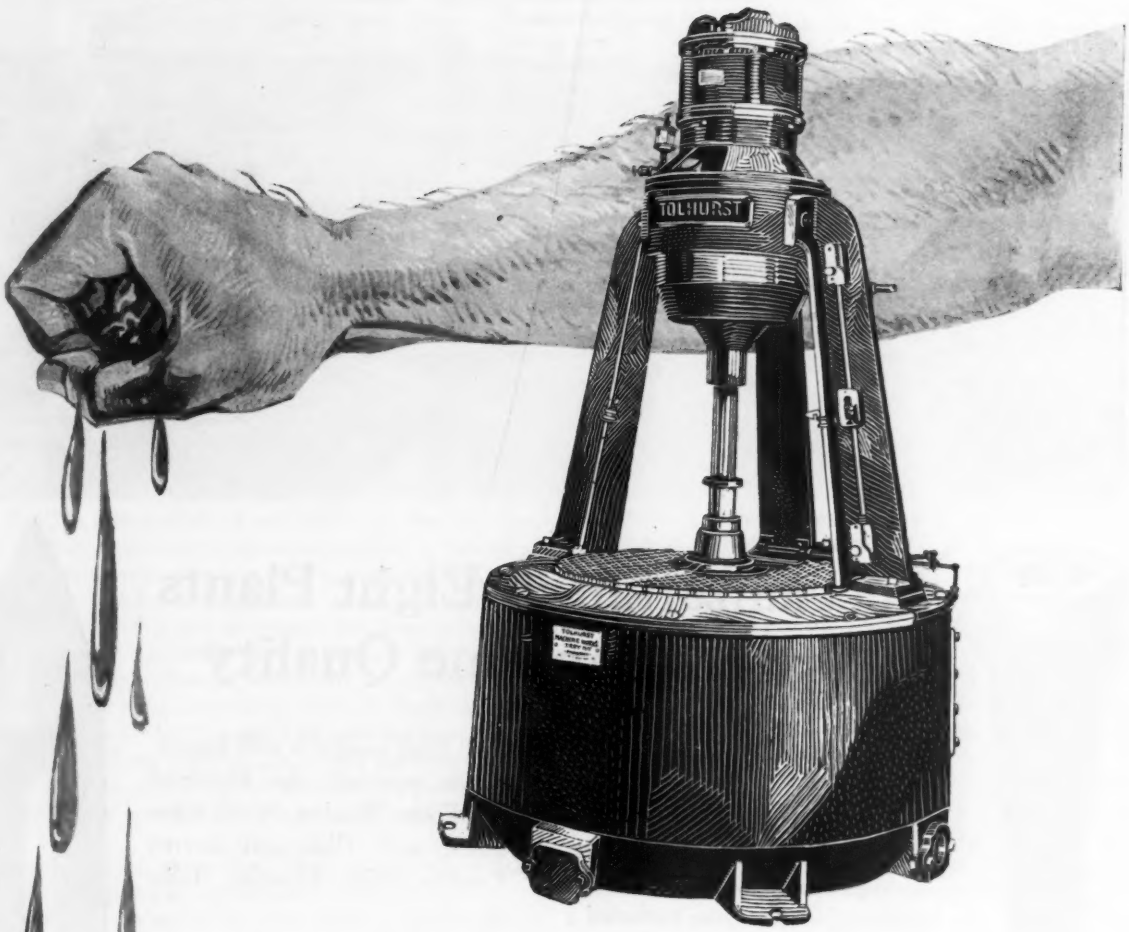
C. C. RIDDLE has recently accepted the position of superintendent of the Ronda Cotton Mills, Inc., Ronda, N. C., succeeding A. R. Eller, it is reported.

ARTHUR C. SHAW, advertising representative of COTTON in New England with John B. Shaw, general sales manager, of Auburndale, Mass., spent several weeks in the South recently on a tour of the industry in that section.

W. E. HAMMOND, superintendent of the Mills Mill, at Greenville, S. C., will be superintendent of the new Balfour Mills, at Balfour, N. C., being erected by Captain Ellison A. Smyth, and associates, it is stated.

W. G. REYNOLDS has resigned as superintendent of the Eastern Mfg. Co., Selma, N. C., to become superintendent at the High Shoals (N. C.) Cotton Mills, recently purchased by the Manville-Jenckes Company.

G. C. TRUSLOW, who has been overseer of wool carding at the Draper-American and Wearwell Sheeting Mills, Draper, N. C., has been made superintendent. His successor in his former position is S. T. Anderson.



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AN OLD TIMER SAYS

One of the most important things an overseer or superintendent has to learn is "economy."

The president of the mill is forever after his superintendent to economize, the superintendent is forever after the overseer to economize, and so down the line.

We have heard the boss talk "Lower your cost; cut off this man or this job; do without this thing or that," until we know what is coming when he begins to talk.

Economy, economize, economizer, or any way you say the blamed thing—some of us believe it all means the same.

Now just what does the word economy mean, anyway? I believe I can cite you one or two instances where the overseer or superintendent either didn't know what the word really means or else was just a natural born fool, one of the two.

Economy is defined as, "Management without loss or waste; frugality in expenditure."

That is the high-faluting way to say it, but let's get right down to plain United States and see what it really means in a cotton mill.

"Management without loss or waste"—that sounds very simple, but let's reason a bit. Here's one on "Old-Timer": I once had a superintendent fooled bad enough to give me a weave room of Draper looms back in 1900, when some of us didn't know as much about Draper looms as we do now. Well, the intermediate gear stand on the take-up was a piece of cast iron with a stud turned up for the gear to run on. Very often, when the cloth would lap up, this stud would break off. I ordered so many of the stands that I was afraid the superintendent would find it out and give me the dickens, so you can imagine how happy I was when I got the idea of taking the broken stand down to the shop and having a hole drilled and threaded to take a steel stud instead of the cast iron one which had broken off. The steel stud was much stronger and I patted myself on the back about having fixed my trouble as soon as I could get around and have them all fixed.

In about two months the second hand reported one day that we were out of intermediate gears. I got the superintendent to get off an order for a half a dozen to come by express, but, bless my soul, if I didn't have more than a half dozen looms standing for intermediate gears before they came in.

Then I waked up to the fact that my strong intermediate stand I had fixed with a steel stud was stronger than the gear, and when the cloth would lap up, the gear *had* to break!

The stand cost, as well as I remember, about one-third as much as the gear. A fine fix I was in and the thing was so confounded bad that I had to go to the superintendent and lay the cards on the table.

No, he didn't take me into the office and give me a good lecture. No, not at all, but of all the cussing you ever heard a poor mortal get, I got it. He was some artist at that cussing game anyway, but that day it seemed to me that he could think of more cuss words than had ever been "invented." You have heard about the fellow who felt little enough to crawl through a keyhole? Well, a keyhole looked as big as a barn door to me then. Cold chills would run up my back every time I would see that superintendent coming, for about a month. That was some lesson in economy to me.

Be sure, my brother, be darn sure, that when you find a way to save a nickle you do not lose a dollar, like I did.

The other part of the definition says "frugality in expenditure," or, in other words, using good judgment in spending money, such as buying supplies, putting a cheap or unintelligent man on a job who will lose many times his wages, etc. Here is an illustration along that line. It is not a story fixed up to illustrate my point, but was an actual occurrence. The superintendent who was responsible for it is dead, and the mill is a very successful one today, but I know it will sound impossible to overseers of weaving who read this article. But the superintendent was a spinner, and this was, at that time, a very small mill just starting up. When the carding and spinning were started and the yarn was ready for the slashers, the boss weaver went to the superintendent and told him they had forgotten to order any draw-in combs to put on the warps as they were taken off of the slasher to hold the lease straight so the draw-in hands could draw the warps through the harness without making crossed warps. (This was, of course, long before a drawing-in machine was thought of.)

The superintendent, being a spinner and not familiar with weaving or drawing-in, proceeded to give the overseer a good lecture by telling him that they were there to make a reputation in starting that mill and that he must learn to do without many of such things as combs for drawing-in hands, and tell those drawing-in hands that they would have to draw the warps without them.

Of course you know what happened: As soon as they put some of those warps into the looms, Mr. Superintendent saw the need of a drawing-in comb or lease comb—a weaver couldn't run four looms to save his life. Fortunately, they had only drawn about 100 warps, but they cost a darn sight more than the combs would have cost.

Now, look out, Mr. Smart Alec, before you say this is such a rank illustration that you know you would never

(*Continued on page* 415.)

Every Audit Should Be

A Detailed Audit

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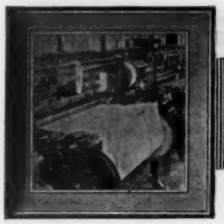
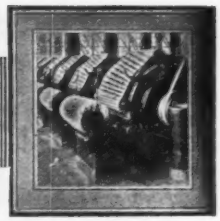


How Other Men Manage

Practical Discussions by Cotton's Readers on all varieties of Mill Subjects



We invite our readers to make use of this department for the discussion of any and all problems arising in the mill or the finishing plant. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so endorsed. This department is open to all.

Better Floor Cleaning Methods Desired.

EDITOR COTTON:

Do any of your readers know of a method of cleaning mill floors dry, with the use of a dustless powder? It seems that most of the cotton mills are using powders, water and scrub brushes in cleaning their floors. I have always thought this a very poor way to do this work, as there should be some way whereby these floors could be kept clean without pouring water over them, causing the maple flooring to cup and the water to go through to the intermediate floor, causing it, in due time, to decay, and besides, it is a dirty nuisance doing the work this way.

We should be very glad if some of your readers would describe some more modern way of doing this work, and discuss whether mill floors cannot be kept clean by using dustless powders and cleaning them dry.

J. F. S. (N. C.)

What is Stick Waste Worth to the Mill?

EDITOR COTTON:

I should like to see some discussion on a subject that certainly has an appeal for every mill. While visiting a 50,000-spindle mill not long ago, the superintendent told me that his stick waste averages 250 pounds a day. I asked him what he did with it, and he replied, "Why, we run it back into the regular stock." Then I made the statement that in my opinion, that stick waste was worth, to the mill, just as much as the spun yarn, but he wouldn't agree with me—and that is what I would like to have discussed in "How Other Men Manage."

Take this man's 50,000-spindle mill. If his daily 250 pounds of roll waste were spun into, say, 30s, it would provide roving for five more spinning frames or, roughly, 1,400 more spindles, which would give him the production of a 51,400-spindle mill, with exactly the same cost in every process, up to the spinning, in labor, material, machinery depreciation and all other factors, that he has to pay for the production of his 50,000 spindles, from which, of course, must be deducted the percentage that his 250 pounds of waste makes. The roving has already been made, and has only a few more inches to go before it is yarn, without any further processing at all.

Furthermore, I do not agree with those who run stick waste back in with the regular stock and declare there is nothing lost. There is the shrinkage, as well as the bad effect which this already-drafted stock has when put back in with the regular cotton.

In some small mills, the practice of cleaning off this waste and selling it is carried out, and in such cases a price of one-third the cost of the yarn is usually used.

Is it possible for us to determine the actual value of this waste to the mill? I repeat my contention that it is worth just as much as the spun yarn, and should be glad to see the opinions of some of your readers. Whether through the use of a stop motion, or otherwise, this stick waste can be eliminated, it presents itself as a universal problem, and, according to my belief, one whose importance is not recognized by mill men as a whole. I hope your readers will discuss this matter freely. F. W. (Ga.)

How Should Woven Elastic Be Sized?

EDITOR COTTON:

We shall be grateful if you or some of your readers can give, in "How Other Men Manage," a formula, together with the method of application, for sizing woven elastic, a sample of which is sent herewith. L. H. (Illinois.)

EDITOR COTTON:

The writer has never had occasion to size elastic goods such as the sample sent by "L. H.," but I have sized narrow elastic knitted fabrics of about the same width or perhaps wider, but containing no rubber threads, and think that perhaps the same process would answer for both. If "L. H." had sent also a sample of the goods after starching to show the stiffness required it would have helped out somewhat. The goods should be tied loosely in bundles or enclosed in nets (as laces are when bleaching) and then packed loosely but compactly in a circular iron cage made so as to fit into a wooden kier. The size, which must be boiled thin, is prepared in another wooden tank placed at a higher level than the kier. When the cage is filled with the goods they are fastened down with cross bars so that they cannot float and the cage and goods is lowered by means of suitable tackle into the kier and fastened down to prevent it from rising. The boiling size is now run into the kier from the *bottom* and when the size rises in the kier a few inches, say six, above the top of the goods in the cage, the centrifugal pump is started and the size is pumped from the bottom of the kier and delivered onto the goods at the top (through a heater) the pump is kept going for about one-half to one hour and the size (which must be

Some day you'll find this man in your plant

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kept hot) is thus constantly circulated through the goods. When the goods have been submitted to the action of the size a sufficient length of time, the starch is pumped back into the mixing tank and used over again (with the addition of fresh starch).

When the starch is all pumped out the case is hoisted out of the kier and allowed to drain, if necessary. The bundles of goods are now carried to a hydro-extractor and hung on poles in a dry room to dry or they may be dried in a loop or truck dryer similar to the one used for drying turkish towels.

By the foregoing process no pressure is brought on the goods anywhere to crease or break them and they are not stretched in length. The following size might answer: 40 pounds of corn starch, 40 pounds of sago flour, one gallon of oleine oil (50 per cent) and water to make 100 gallons after boiling half an hour. Enough starch must be made of these proportions to completely cover the goods.

J. C. R. (Maine)

What is the Best Way to Measure Roll Settings?

EDITOR COTTON:

I should be glad to see discussed in your "How Other Men Manage" Department, various methods of measuring the settings of the rolls of drawing, slubbing and spinning frames. M. R. K. (Ga.)

EDITOR COTTON:

Answering "M. R. K.'s" question, the method we use in measuring the distance between rolls on drawing, slubbing and spinning frames is to use a steel gauge similar to those used in machine shops, and graduated in eighths, sixteenths, thirty-seconds and sixty-fourths, as well as inches. The gauge is about one inch wide and three-thirty-seconds of an inch thick, which gives a narrow edge to use in measuring. The gauge is six or twelve inches long. It may be found in tool catalogs under the name of a steel scale.

We do not measure on the boss or fluted part of the roll but measure between the boss as that part of the roll is smooth and the measurements are more easily read. We do not place the end of the scale on the roll to be measured, but place the one-inch line on the middle of that roll. If the distance to the middle of the next roll is 1½ inches the reading on the scale will be 2½ inches, but as the measurement was started at the one-inch line, this inch must be deducted from the scale reading, which leaves 1½ inches as the correct distance. In measuring steel rolls of small diameter, like those mentioned, with a steel gauge it is very easy to see where the gauge rests on the roll and the measurements have been found sufficiently accurate for practical purposes. Contributor No. 21.

EDITOR COTTON:

There are quite a few methods of measuring the setting of rolls on drawing, slubbing and spinning frames, and which one is best will depend largely upon which method best suits the requirements of the user.

Accurate results are obtained by calipering from outside to outside of two rolls at a time and then subtracting from that the radius of each roll.

In other words, say that we want to get the setting of our slubber rolls. We will assume for convenience that all three rolls are one inch in diameter. In calipering from outside to outside of the middle and back rolls, we find the distance to be 2½ inches. From this we subtract the radius of each roll, which is ½ inch (or both of them together will be 1 inch) and this gives the distance from center to center to be 1½ inches. The distance from center to center of the front and middle rolls is found in like manner.

Another good method is to caliper the distance between the rolls and add to that the radius of each roll. Either of these methods gives accurate results so far as the steel rolls are concerned, but it must be borne in mind that the leather top rolls are not always on the center of the steel rolls. Consequently, the bite of the rolls, as we call it, may not be exactly the distance as between the centers of the steel rolls. As the distance from bite to bite of the rolls is what we are most vitally interested in, I have found the following method of getting the settings to be accurate enough for all practical purposes and about the easiest and quickest way to get them:

Stop the frame you want to get the settings on and remove one set of the top rolls. Lay across the steel rolls a piece of fairly stiff paper—something like a letterhead—about ½ inch wide. Then place the top rolls back in position and hook up the weight or weights, and let it set for a minute or so and then take out the paper.

On the back of the paper you will find the print of the flute of the steel rolls. Measure the distance between the flute prints and you will find it to be the distance from bite to bite of the rolls. The imprints on the paper can be made to show plainer, if desired, by pressing down on the rolls while they are in place with the paper between.

C. R. H. (S. C.)

Asks for Suggestions on Drafts.

EDITOR COTTON:

I wish "A. D. (N. C.)," "U. D. (Ala.)," "Wash (R. I.)," and any other readers of your discussion department would express their opinions on this question:

I should like to secure some good average drafts. I run a variety of hang-ups, sometimes with two ends up, sometimes with one end up, and sometimes without one process of roving. Please give the drafts for the following work, the roving to weigh 54 grains back of slubber:

For 16s/1 yarn from 1-inch stock, and for 18s/1 yarn from 1 1/16-inch stock, and for 20s/1 from 1⅛-inch stock, and for 30s/1 from 1⅛-inch stock, with one end up on slubber, two ends up on intermediate, two ends up on fine frame, and two ends up in spinning.

Then for the 16s, 18s and 20s mentioned, with one end up on slubber, two ends up on intermediate, no fine frame, and one end up in spinning. J. D. (Maine.)

Slack Yarn in Chain Warps.

EDITOR COTTON:

"N. J. P. (N. C.)," in the November number, asks a question regarding the reason for slack yarn in chain warps. I will try to answer his question, but first will show how slack yarn was made on the old-style circular warper. Warps made on the old-fashioned mill warper,

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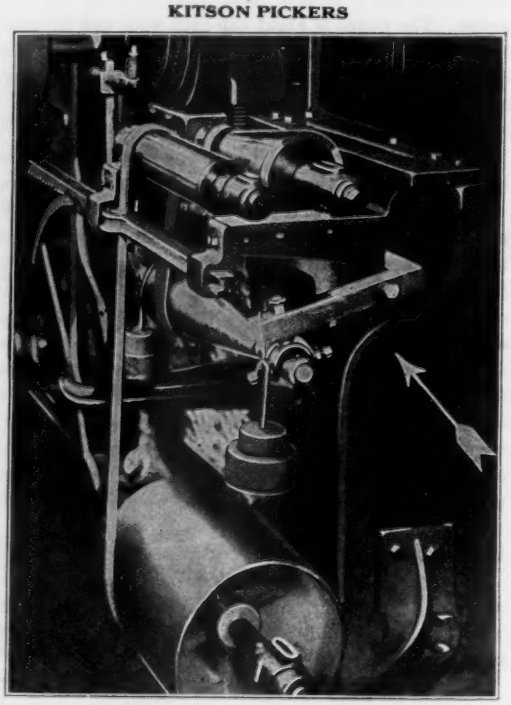

BAHAN TEXTILE MACHINERY COMPANY
Greenville, S. C.

which was a vertical reel with a diameter of from 22 to 24 yards, were made by passing the threads from the creel through a leasing heck and making them fast to lease pegs at the bottom of the warper. The lease was then taken and the warper started and at the same time the heck rose. As the reel rotated the yarn was wound in a spiral until the required number of yards were made, and then another set of lease pegs put on the warper and the top leases taken, the warper then being run in the opposite direction and the heck descending, placing a second layer of yarn upon the first layer. The cycle of operations was repeated until the required number of threads to make the warp were wound. The leases were held in place by bands and the warp taken from the warper.

Previous to taking the warp off the warper, what were known as water bands were tied around the chain about seven or eight yards apart. These bands were put on to help keep the chains from spreading and overlapping the other warps when put through the dyeing and sizing and drying processes; also to prevent the development of slack yarn as much as possible.

Now it should be plain to any mill man who has handled warps in chain form that the first layer of yarn put on the vertical warper would of course be shorter than the last layer put on, and in consequence there would be more or less slack yarn from this kind of warping.

Now, speaking of modern machines, when a warp is made on the Denn or Walcott, or any other warper that condenses the warp from a flat sheet down to a rope of yarn one-half inch or more in diameter, it leaves the delivery rolls in a spiral if allowed to drop in a bag or sheet. The warps are held together, or ought to be, by water bands to prevent, as far as possible, the development of slack yarn in the dyeing, sizing or drying process. Four chain warps going together through the dyeing machine, over and under the rolls in the vat, and through the squeeze rolls, thence to the trucks in which the warps are laid by hand to prevent snarling, get more or less stretching and sometimes snarled and broken as all beamer tenders know, and the warping room gets most of the blame for the bad work.

Slack yarn in chain warps made on modern warpers is made and developed in the dyeing, sizing and drying processes; the smaller the warp the less the slack yarn. When a chain warp, after dyeing and sizing, is dryed over hot revolving cylinders, the warp being in a rope form gets the inner surface dried first and the stretching of the warp begins. The slack yarn will sometimes double on itself or be held up at the water bands, and make what are known as festoons, or, if the bands get broken the slack will show more and more and may reach the floor underneath the cylinders. The attendant, seeing so much slack yarn, takes hold of the warp as it leaves the dryer and pulls on the slack side to help it along, which it does, but not for the benefit of the beamer tender.

There is not as much slack yarn developed in chain warps today as there used to be, owing to the use of a device to wind a thread of yarn in a spiral form around the chain from start to finish as a binder. I have made chain warps on the old-style mill or circular warper, the Denn and Walcott warpers, and ball warps, and handled them in the dyehouse and beamed them. J. J. B. (Conn.)

An Old Timer Says—

(*Continued from page* 409.)

make such a mistake. Maybe not, but you have made mistakes and plenty of them, and what I am trying to drive into your noodle is an illustration that will make you think, and think hard, before you make some more mistakes. You are bound to make mistakes, but for goodness' sake, let them be *new* ones, not the same old ones time after time. It's the fellow who keeps on making the same old mistakes that stays on the little job.

A man who is not too large for the job he is on is too small for it. Making the same class of mistakes repeatedly is one of the things that make a man too small for his job, and the first thing you know he will be on a smaller job where he belongs.

Birds of a feather flock together, is a true saying, and that means that big jobs and big men—and little jobs and little men—will also flock together.

So many of us confuse "economy" with "*not* spending money." It doesn't mean that at all. *Not* spending money oftentimes means extravagance, as the illustrations I have pointed out clearly show. Sometimes *spending* money, in the *right* way, will be "management without loss or waste," if good judgment is exercised in making that "expenditure."

Finishing Olive Drab Napped Cotton Jeans and Waterproofing Shelter Tent Dyed Duck.

EDITOR COTTON:

I am enclosing herewith two samples of cotton piece goods. One is an olive drab, and the other is a shelter tent duck. I would greatly appreciate your furnishing information of the following nature through "How Other Men Manage."

With regard to the olive drab sample, I would like to have some dope as to just how to proceed in the finishing department with this sample after it has been dyed, outlining the necessary machinery, etc.

In reference to the shelter tent duck, I would like to have a formula for waterproofing. Can I waterproof it successfully with the equipment I have, viz., one 3-roll padder and a set of 24 drying cans?

H. F. (Mass.)

EDITOR COTTON:

In reply to "H. F.'s" inquiry, I would say that the first sample referred to is a kind of heavy cotton jean dyed olive drab and closely napped with a thick short nap on the back side, the kind of material which is largely used in making sheepskin lined coats out of. These goods are napped (or should be) before dyeing on a French napping machine, getting from two to four runs through the machine. After dyeing they are washed *thoroughly* in cold clean water. They are then mangled through warm water and squeezed as dry as possible. Just before entering the nip of the mangle they should pass over a rail covered half-around with coarse, open, almost straight, card clothing, as shown in Fig. 1, the letter *A* indicating the card clothing.

The clothing should have rubber backing and very little "keen," in fact, the writer has used straight wire; if, however, there is any keen it must point in the direction the

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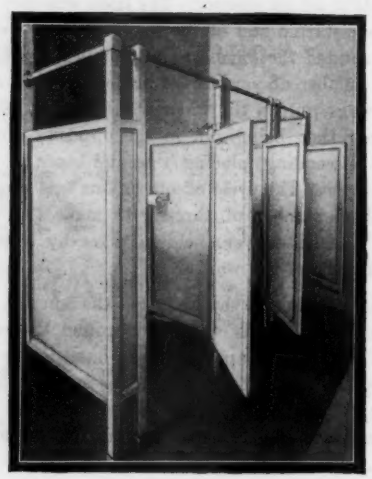

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cloth is traveling. This should comb the nap down smooth and straight and flat.

After drying the goods must lie until cool and must then be calendered through a cold calender with wooden rolls and fairly heavy set, the goods being run over a card again as in the mangle just before entering the nip. Care must be taken, however, to run the goods in exactly the same direction as before and not in a contrary direction to the previous run, or the nap, previously smoothed out, will be all ruffled up in the opposite direction. During the

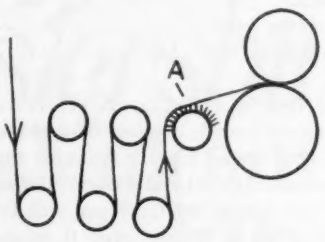


FIG. 1.

run, both in the mangle and on the calender, the card clothing may fill up with lint and may require to be stripped quite frequently. It must be kept clear.

With regard to waterproofing the shelter tent goods, the goods should first be mercerized without tension. This shrinks them both in width and length and it closes all the interstices in a closely woven duck and makes it easy to waterproof; after washing the goods should be padded in a solution of acetate of alumina and dried up. The goods must be dried thoroughly dry so as to drive out all the acetic acid. After drying they must be allowed to cool off and then soaped in a five per cent solution of some neutral milling soap dissolved in soft water. The fabric is drawn through this solution and mangled on a three-bowled mangle similar to that shown in Figure 1, but, of course, without the card clothing. By this process an insoluble alumina soap is formed on the fiber, which adheres so that neither water nor mechanical means can remove it.

After soaping, the goods are run through a cold bath of sulphate of alumina at about one or two degrees Tw., and then thoroughly rinsed.

By this process—if the goods are not mercerized first—they must be thoroughly wet out in hot and cold water first and squeezed as dry as possible on the padder or the water mangle; the acetate of alumina must be used cold and at a strength of about seven or eight degrees Tw. in all cases.

The casinate of ammonia method of waterproofing is also a good one. By this process the fabric retains its softness and perviousness to air and to enable it to be washed with soap, benzine, etc., without interfering with its waterproofness. The process is conducted as follows:

Casein is mixed with about five times its weight of warm (not boiling) water, and the whole is well stirred to a creamy liquid. Ammonia is added to this until the casein is brought into a state of perfect solution. At the same time some good mill soap (but not soft soap) weighing about half the weight of the amount of the casein is dissolved in twelve times its weight of water, and this soap solution is added to the casein solution; if the mixture is not thoroughly dissolved the addition of a little ammonia or soda ash will make it so.

The *dry* goods are thoroughly impregnated with this mixture by two runs hot (but not boiling; this is important) on the padding machine. The fabric is next dipped in acetate of alumina which makes the caseinate of ammonia insoluble and forms a margarate of alumina with the alkaline soap. This acetate of alumina may be applied by means of one or two runs (cold) through the padder, the strength may be five or seven degrees Tw. The goods are now washed and dried up.

Returning to the first part of the inquiry, regarding the olive drab, I might say that after mangling and drying as outlined, it is a great improvement to give the goods one or two runs over the French napper to raise the nap before calendering, this, however, is not always necessary.

W. B. (Maine)

Figuring J. T. L.'s Production Question.

EDITOR COTTON:

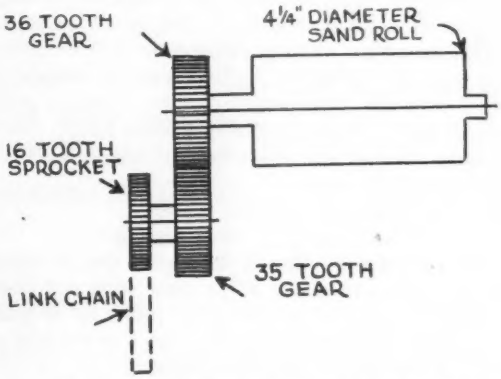
In reply to "J. T. L. (N. C.)" concerning his loom problem, as outlined in your November issue, namely to know what part of an inch will one link in the chain produce in the cloth or towel:

To find the circumference of the sand roll, multiply the diameter by 3.1416. In his case this would be 4¼ inches × 3.1416 = 13.3518 or 13.352 inches.

Now to find the relation between one tooth of the 16-tooth sprocket and the amount delivered on the circumference of the sand roll—

$$\frac{35 \times 13.352}{36 \times 16} = .811$$ or practically 13/16 of an inch;

that is, if it were possible to run a 16-link chain, the



length would be 13/16 of an inch for each link. Then one complete revolution of the 16-tooth sprocket would deliver 13 inches on the sand roll.

I think that if this is not enough for "J. T. L." that I maybe can help him more if he so desires.

H. D. (Mass.)

G. L. MEACHAM, superintendent of the Diamond Cotton Mills, Inc., Salisbury, N. C., has resigned to become superintendent at the Eastern Mfg. Co., Selma, N. C., succeeding Mr. Reynolds, resigned.

ROBERT HALSEY has been appointed assistant superintendent of the Opelika Cotton Mills, Opelika, Ala.

H. O. BALL, manager and superintendent of the Pepperton Cotton Mills, Jackson, Ga., is now also treasurer of the company.

Mixed Yarn Computations.

EDITOR COTTON:

Replying to the inquiry for information as to a method of computing the size and weight of cotton yarn and an artificial silk thread in a mixed yarn in the January number:

The method of numbering cotton yarn is based upon a length of 840 yards, wound on a reel of 54 inches in circumference, known as one hank. One revolution of the reel, 54 inches = 1½ yards or one thread; 80 revolutions = 120 yards or one lea; 7 leas = 840 yards or one hank. The number of hanks of 840 yards that weigh one pound denotes the size or count of the yarn.

The usual method of finding the count of cotton yarn is by reeling 120 yards, or 1/7th of one hank, and finding its weight in grains. Divide this weight in grains into 1,000 grains, or 1/7th of a pound, and the answer will give the size or count of the yarn. As an example: Find the size or count of 120 yards of cotton yarn, weighing 50 grains. 1,000 grains (1/7th of a pound) ÷ 50 grains (weight of 1/7th of a hank) = 20s single cotton yarn.

It should be noted that if the yarn is two-ply, only 60 yards should be reeled; if three-ply, reel 40 yards, and find the weight in grains the same as for single yarn.

In artificial silk, the method for numbering the yarn or thread is based upon a length of 492 yards or 450 meters, wound on a reel of 44.3 inches or 1.125 meters in circumference. The method of sizing artificial silk is the same as that for real or cocoon silk, and is designated by the term "denier." A denier is a unit of weight equivalent to .05 of a gram or .77 of a grain and the weight in grams of a 450 meter skein, divided by .05 grams, or the weight in grains of a 492 yard skein, divided by .77 grains, will give the denier size of the artificial silk.

A convenient method of finding the size of artificial silk is by reeling 123 yards, and finding its weight in grains, multiplying this weight by 4 and dividing by .77. As an example: Find the size of an artificial silk thread if 123 yards weigh 28.9 grains.

28.9 × 4 = 115.6 grains.
115.6 ÷ .77 = 150 denier size.

The legal metric system of finding the size of artificial and real silk, is by reeling a 450 meter skein and finding its weight in grams, and dividing this weight by .05 grams. An example: Find the legal denier size of an artificial silk thread if 450 meters weigh 7.5 grams.

7.5 ÷ .05 = 150 denier size.

It may be stated that the same result may be obtained by multiplying the weight in grams by 20.

All artificial silk size is expressed in deniers and is based on a measurement of 450 meters.

450 meters equal 492.12 yards.
One pound equals 453.6 grams.
One gram equals 20 deniers.
453.6 grams × 20 deniers equals 9,072 deniers in one pound.
9,072 deniers × 492.12 yards equals 4,464,500 yards to one pound of one denier, real or artificial silk.

The coarser the silk, the less the number of yards to the pound. A 150-denier silk would have 4,464,500 divided by 150 or 29,763 yards to the pound.

In direct answer to your correspondent's inquiry as to the best method for figuring the cost of 150 denier artificial silk and 30s cotton yarn twisted together: The market price of single 30s combed peeler yarn is quoted at 70 cents per pound. Its yardage is 25,200 per pound.

The market price of 150 denier artificial silk is quoted at $2.75 per pound. Its yardage is 29,763 per pound.

It would require 25,200 yards of 150 denier artificial silk to twist with one pound of 30s single cotton, or 25,200 ÷ 29,763 = .8467 pounds of artificial silk. Then $2.75 × .8467 = $2.3284, cost of artificial silk to one pound of cotton yarn.

Cost of cotton yarn $0.70
Cost of artificial silk 2.3284

Combined cost $3.0284

To the total pounds required finished must be added the percentage of loss as waste. Assuming that 1,000 pounds of yarn is to be finished and a waste allowance made of five per cent for cotton and three per cent for artificial silk. To each pound of cotton yarn it would require .8467 pounds of artificial silk or .5415 per cent of cotton to .4585 per cent of artificial silk by weight. 1 pound of cotton plus .8467 pounds artificial silk = 1.8467 total.

.8467 ÷ 1.8467 = .4585 per cent artificial silk.
1.000 ÷ 1.8467 = .5415 per cent cotton.
.5415 per cent of 1,000 = 541.5 pounds cotton yarn.
.4585 per cent of 1,000 = 458.5 pounds artificial silk.
458.5 pounds artificial silk plus 3 per cent for waste = 472.25 pounds.
541.5 pounds cotton plus 5 per cent for waste = 568.58 pounds.

472.25 pounds artificial silk at $2.75 = $1298.6875
568.58 pounds cotton yarn at 0.70 = 398.006

Total $1696.6935

Thus, in direct answer to the question submitted, $1,696.69 is shown to be the total cost of the combination yarn given. I trust this will be satisfactory.

I am also attaching a comparative yarn table which may prove of assistance in the figuring of other problems of this nature.

M. L. B. (N. Y.)

COMPARATIVE YARN TABLES.

Spun Silk & Cotton Scale	Yards Per Lb.	Yards Per Oz.	Meters per Kilogram	Scale in Legal Deniers	Drams Per 1000 Yards
10	8,400	525	16,928	531.491	30.476
10½	8,820	551¼	17,775	506.182	29.024
11	9,240	577½	18,621	483.172	27.705
11½	9,660	603¾	19,468	462.166	26.501
12	10,080	630	20,314	442.910	25.396
12½	10,500	656¼	21,161	425.193	24.380
13	10,920	682½	22,007	408.839	23.443
13½	11,340	708¾	22,853	393.698	22.574
14	11,760	735	23,700	379.637	21.768
14½	12,180	761¼	24,546	366.546	21.018
15	12,600	787½	25,393	354.328	20.317
15½	13,020	813¾	26,239	342.898	19.662
16	13,440	840	27,072	332.182	19.047
16½	13,860	866¼	27,932	322.115	18.470
17	14,280	892½	28,779	312.642	17.927
17½	14,700	918¾	29,625	303.709	17.414
18	15,120	945	30,471	295.273	16.798
18½	15,540	971¼	31,318	287.293	16.473
19	15,960	997½	32,164	279.732	16.040
19½	16,380	1,023¾	33,011	272.560	15.628
20	16,800	1,050	33,857	265.746	15.238
20½	17,220	1,076¼	34,704	259.264	14.866
21	17,640	1,102½	35,550	253.091	14.512
21½	18,060	1,128¾	36,397	247.205	14.174
22	18,480	1,155	37,243	241.586	13.852

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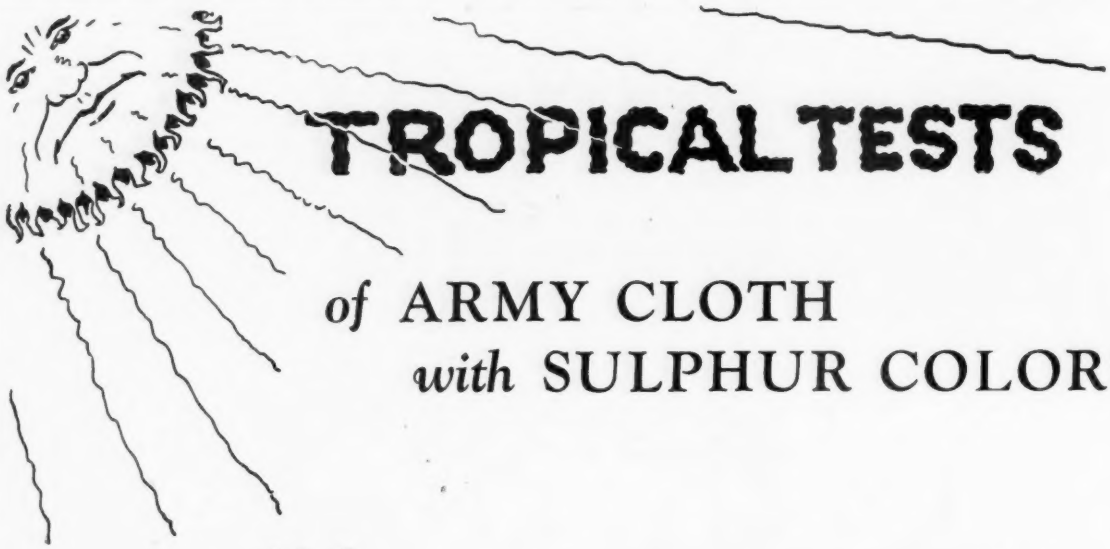

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These tests consist of exposure to service conditions in the tropics and treatment in the post laundries under usual conditions.

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Spun Silk & Cotton Scale	Yards Per Lb.	Yards Per Oz.	Meters per Kilogram	Scale in Legal Deniers	Drams Per 1000 Yards
22½	18,900	1,181¼	38,089	236.218	13.544
23	19,320	1,207½	38,936	231.083	13.250
23½	19,740	1,233¾	39,782	226.167	12.968
24	20,160	1,260	40,629	221.455	12.698
24½	20,580	1,286¼	41,475	216.936	12.439
25	21,000	1,312½	42,322	212.597	12.190
25½	21,420	1,338¾	43,168	208.428	11.951
26	21,840	1,365	44,015	204.420	11.721
26½	22,260	1,391¼	44,861	200.563	11.500
27	22,680	1,417½	45,707	196.849	11.287
27½	23,100	1,443¾	46,554	193.270	11.082
28	23,520	1,470	47,400	189.818	10.884
28½	23,940	1,496¼	48,247	186.488	10.693
29	24,360	1,522½	49,093	183.273	10.509
29½	24,780	1,548¾	49,940	180.167	10.330
30	25,200	1,575	50,786	177.164	10.158
30½	25,620	1,601¼	51,632	174.260	9.992
31	26,040	1,627½	52,479	171.449	9.831
31½	26,460	1,653¾	53,325	168.727	9.674
32	26,880	1,680	54,144	166.091	9.523
32½	27,300	1,706¼	55,018	163.536	9.377
33	27,720	1,732½	55,865	161.057	9.235
33½	28,140	1,758¾	56,711	158.654	9.097
34	28,560	1,785	57,558	156.321	8.963
34½	28,980	1,811¼	58,404	154.055	8.833
35	29,400	1,837½	59,250	151.855	8.707
35½	29,820	1,863¾	60,097	149,716	8.584
36	30,240	1,890	60,943	147.637	8.399
36½	30,660	1,916¼	61,790	145.614	8.349
37	31,080	1,942½	62,636	143.646	8.236
37½	31,500	1,968¾	63,483	141.731	8.126
38	31,920	1,995	64,329	139.866	8.020
38½	32,340	2,021¼	65,176	138.049	7.915
39	32,760	2,047½	66,022	136.280	7.814
39½	33,180	2,073¾	66,868	134.555	7.715
40	33,600	2,100	67,715	132.873	7.619
40½	34,020	2,126¼	68,561	131.233	7.524
41	34,440	2,152½	69,408	129.632	7.433
41½	34,860	2,178¾	70,254	128.070	7.343
42	35,280	2,205	71,101	126,546	7.256
42½	35,700	2,231¼	71,947	125.057	7.170
43	36,120	2,257½	72,794	123.603	7.087
43½	36,540	2,283¾	73,640	122.182	7.006
44	36,960	2,310	74,486	120.793	6.926
44½	37,380	2,336¼	75,333	119.436	6.848
45	37,800	2,362½	76,179	118.109	6.772
45½	38,220	2,388¾	77,026	116.811	6.698
46	38,640	2,415	77,872	115.542	6.625
46½	39,060	2,441¼	78,719	114.289	6.554
47	39,480	2,467½	79,565	113.083	6.484
47½	39,900	2,493¾	80,412	111.893	6.416
48	40,320	2,520	81,258	110.727	6.349
48½	40,740	2,546¼	82,104	109.586	6.283
49	41,160	2,572½	82,951	108.468	6.219
49½	41,580	2,598¾	83,797	107.149	6.156
50	42,000	2,625	84,644	106,298	6.095
51	42,840	2,677½	86,337	104.214	5.975
52	43,680	2,730	88,030	102.210	5.860
53	44,520	2,782½	89,722	100.281	5.750
54	45,360	2,835	91,415	98.425	5.643
55	46,200	2,887½	93,108	96.635	5.541
56	47,040	2,940	94,801	94.909	5.442
57	47,880	2,992½	96,494	93.244	5.346
58	48,720	3,045	98,195	91.637	5.254
59	49,560	3,097½	99,880	90.083	5.165
60	50,400	3,150	101,573	88.582	5.079
61	51,240	3,202½	103,265	87.130	4.996
62	52,080	3,255	104,958	85.725	4.915
63	52,920	3,307½	106,651	84.364	4.837
64	53,760	3,360	108,288	83.045	4.761
65	54,600	3,412½	110,037	81.768	4.688
66	55,440	3,465	111,730	80.529	4.617
67	56,280	3,517½	113,423	79.327	4.548
68	57,120	3,570	115,116	78.161	4.481
69	57,960	3,622½	116,809	77.028	4.416
70	58,800	3,675	118,501	75.927	4.353
71	59,640	3,727½	120,194	74.858	4.292
72	60,480	3,780	121,887	73.818	4.199
73	61,320	3,832½	123,580	72.807	4.174
74	62,160	3,885	125,273	71.823	4.118
75	63,000	3,937½	126,966	70.866	4.063
76	63,840	3,990	128,659	69.933	4.010
77	64,680	4,042½	130,352	69.025	3.957
78	65,520	4,095	132,045	68.140	3.907
79	66,360	4,147½	133,737	67.277	3.857
80	67,200	4,200	135,430	66.436	3.809
81	68,040	4,252½	137,123	65.616	3.762
82	68,880	4,305	138,816	64.816	3.716
83	69,720	4,357½	140,509	64.035	3.671
84	70,560	4,410	142,202	63.273	3.628
85	71,400	4,462½	143,895	62.528	3.585
86	72,240	4,515	145,588	61.801	3.543
87	73,080	4,567½	147,280	61.091	3.503
88	73,920	4,620	148,973	60.396	3.463
89	74,760	4,672½	150,666	59.718	3.424
90	75,600	4,725	152,359	59.055	3.386
91	76,440	4,777½	154,052	58.406	3.349
92	77,280	4,830	155,744	57.771	3.312
93	78,120	4,882½	157,438	57.150	3.277
94	78,960	4,935	159,131	56.542	3.242
95	79,800	4,987½	160,824	55.946	3.208
96	80,640	5,040	162,516	55.364	3.174
97	81,480	5,092½	164,209	54.793	3.141
98	82,320	5,145	165,902	54.234	3.109
99	83,160	5,197½	167,595	53.575	3.078
100	84,000	5,250	169,288	53.149	3.047

What is the Best Speed for Card Grinding Rolls?

EDITOR COTTON:

I should like to see a discussion on the speed of card girnding rolls, and would be particularly interested in having "Old-Timer's" opinion. What is the opinion of the readers on fast speed for these rolls, and what speeds are they using for best results? I have been running my rolls about 742 r.p.m., and find that we do not get good results. I would like to have some up-to-date carders and superintendents explain the effect of fast grinding. I find that I cannot get a good needle point on the wire with fast grinding; it gives a flat, horny-feeling point on the wire.

P. T. E. (S. C.)

A Cure for F. C. J.'s Loom Trouble.

EDITOR COTTON:

In reply to "F. C. J. (S. C.)," I will say he has backlash in his line shafts, and if he has several shafts running parallel, and no doubt his main drive is coupled up at one end, I would suggest that he take two ordinary split steel pulleys —say 30 inches in diameter with a two- or three-inch face, near the opposite end from the main drive and put on a light double belt. Any old belt will do as it is merely a follower drive. I like this way better than balance pulleys as they may cause the couplings to come loose. However, I have worked where they were used, the rims being about 1½ inches thick with a two-inch face, and I guess they weighed 150 pounds or more. I had some pulleys and belts on, as I have outlined above, and last spring we had our shafting realigned and I was told I would not need my followers, but it was not long before I began to have trouble with five, six or eight looms slamming in a line, therefore, I had my pulleys and belt put back on and stopped the trouble at once. It is possible not to have this trouble noticeable on all lines, but if it is there, if "F. C. J." will belt them up in this way he will find it all right.

Tar Heel (N. C.)

EDITOR COTTON:

Replying to the question of "F. C. J. (S. C.)" in the December number of COTTON, with reference to his difficulty with his line shafting and balance wheels in the weave

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room, I do not think he has given us enough information, quite, to reach a conclusion regarding his trouble.

However, if the installation was properly engineered, the size of the long shaft and the width of the drive belts and the length of the drive is of about the same ratio as the shorter shaft. But I do not think his trouble is with this shaft, or fly wheel. I have had some experience with jerky looms, and I believe, first, that "F. C. J.'s" speed is too high at 160 picks per minute. I ran the same kind of loom at this speed, and reduced it to 150 picks, and have had them on that speed for more than two years, finding that we get better running work, less cost in supplies, and our records show better production and higher quality.

One thing that will cause a loom to jerk and slam occasionally is the head gears being worn on the pick, causing too much lost motion. He should see to this, and change the pick or replace with new gear if necessary.

Next he should see that the lug doesn't have too much play. The pick cam is so constructed that it begins picking slowly and increases as the pick cone comes nearer the point of the cam. If there is too much play in the lug, the advantage of this gradual picking is lost in the taking up of the play in the lug, and the pick comes on too suddenly, producing what is called a harsh pick, and if there is the least tendency for the belt or friction to slip, the result is a jerky, slamming loom. I think the proper thing is to take the lug up so it will have about a half inch play behind the picker stick when the picker stick is at rest in the end of the lay. Disregard the length of the stroke of the picker stick as the picking motion being worn, possibly more on some looms than on others, will give a longer stroke on some looms than on others. The check strap should be set accordingly and the pick cam set so it just begins to pick when the crank is about three-quarters of an inch past the top center. This lets the lay just a little further back as the shuttle enters the shed, and gives the shuttle more room to pass through.

Another thing: the harness cam should be set so that the harness will be level when the crank is about an inch past the bottom center. This lets the shed close just a little later and gives the shuttle more time to get through without chafing the warp.

But if a man has a loom that needs this setting and it doesn't function properly when it is set, he shouldn't give up. He should parallel the pickers, line up the shuttle boxes, adjust the power, and it will run, and run good, too. I know what I am talking about. I don't claim to be an expert, but I have lost many hours' sleep over Draper loom problems, and have rolled up my sleeves and fought many battles with them.

Shuttle boxes set too tight and too much power will cause a loom to jerk and slam. Instead of changing fixers in the room, just change "fixing," "F. C. J.," and let us hear from you again. I know our South Carolina friend will pull out some way, because he is interested. Let's have some more discussions on weaving and fixing looms.

Jack (Texas)

T. A. CASTON is now general superintendent of the Draper-American and Wearwell Sheeting Mills, at Draper, N. C., succeeding W. P. Barnes, who recently resigned.

Towels and Toweling.

(*Continued from page* 401.)

and 10th threads and on the 9th pick (counting from the bottom) as shown by the stippled squares in the positions indicated. The doubled over portion in Fig. 38 suggests a method of making a diamond design from the regular diagonal weave W, Fig. 39. With little difficulty, this could be done, and the result would be quite effective.

The fabric produced in Fig. 38 was woven for demonstration purposes only with 2-fold white mercerized cotton warp and with a similar make of green filling; there are 52 threads per inch and about 56 picks per inch. The complete pattern occupies 78 threads and is composed as follows:

Design on ogee weave X	= 25 threads
Basket twill, left-hand	= 11 threads
Basket twill, right-hand	= 23 threads
Basket twill, left-hand	= 19 threads
Total	78 in all

A more elaborate sample than any of the foregoing is exhibited in Fig. 40, the original of which, woven for sample and demonstration purposes only, is in 2-fold mercerized green cotton yarns with 50 threads per inch and 48 picks per inch. A complete unit of the pattern is about 4 inches wide, and contains 204 threads, arranged in the following sequence:

16 threads of left-hand twill
32 threads of imitation gauze
16 threads of right-hand twill
76 threads of imitation gauze diamond
16 threads of left-hand twill
32 threads of imitation gauze
16 threads of right-hand twill

206 threads in all

Comparison with Figs. 34 and 35 will show that the present example is a development of the fabric there described. Indeed all parts of the complete weave of the fabric in Fig. 34 are used in Fig. 40, and a contrasting effect is secured by the introduction of a further 76 threads to produce an imitation gauze diamond weave.

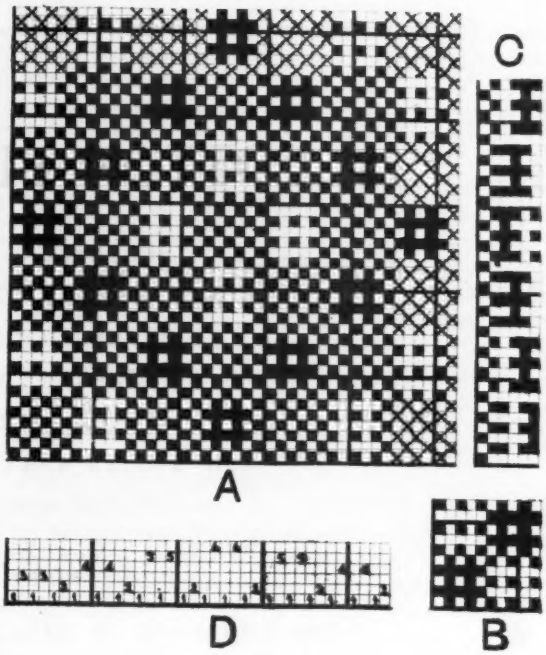

FIG. 41.

One repeat of this diamond weave is given at A, Fig. 41, in solid black squares, while a further 6 picks and 6 threads have been added, partly in solid squares and partly in crosses, in order to show a complete diamond. The unit is contained by 36 threads and 36 picks, and can be woven on 6 harnesses, using the weaving plan C and the corresponding draft D.

Reverting to Figs. 34 and 35, it will be seen that the twill weave requires 6 harnesses, and the imitation gauze a further 4 harnesses, making 10 in all. The present diamond weave necessitates another 6, all different from the first 10,

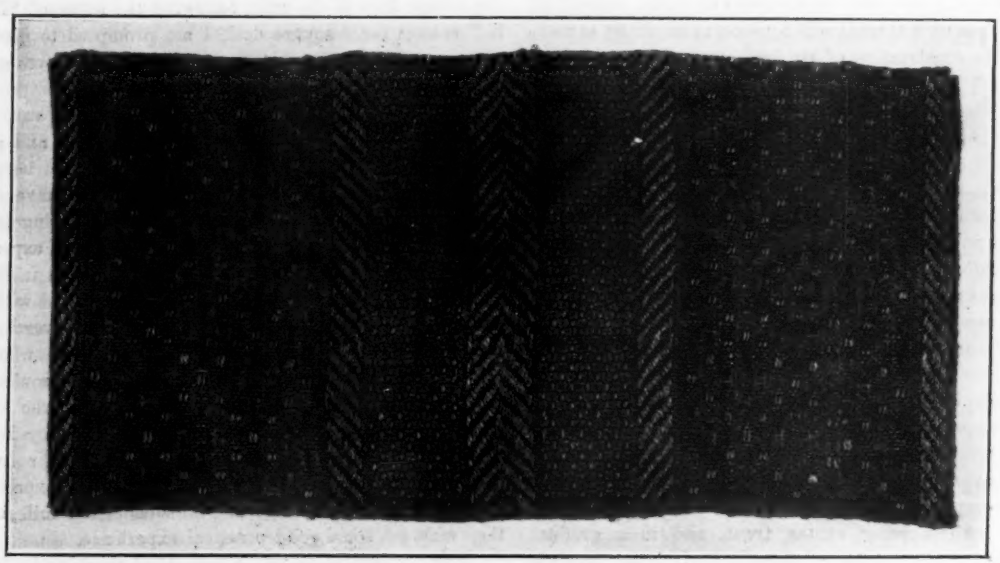

FIG. 40.

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so that the complete pattern demands 16 harnesses with a draft and weaving plan to correspond.

The imitation gauze diamond is developed from the 10-thread imitation gauze weave of which one repeat or unit is shown at B, Fig. 41. Plain threads and picks are introduced to separate the warp float blocks from the filling float blocks, and these plain threads and picks account for the complete weave A being complete on a multiple of 6 threads and 6 picks, viz., 36 threads and picks, instead of on a multiple of 5 threads and 5 picks, as might be expected from the construction of the base weave B.

In draft D, Fig. 41, the plain threads are confined to the two front harnesses, following the usual and often best procedure of having the most crowded harnesses nearest the weaver. We shall have occasion, however, to introduce exceedingly successful examples in which the above custom of placing the plain threads on harnesses nearest the weaver is partially departed from.

By following the above custom of arranging the crowded harnesses near the weaver, the draft shown at D, Fig. 41, might be somewhat improved—although the order would be rendered more intricate—by moving the 4th and 5th harnesses to the places occupied by the 3rd and 4th harnesses respectively, and by moving the 3rd harness to the position occupied presently by the 5th harness. This alteration would naturally necessitate a corresponding rearrangement of the weaving plan C.

The complete arrangement would result in the most crowded harness being at the front, and in a gradual diminution of the number of threads per harness towards the back in regular succession. The reader of the subject will find it a useful exercise to work out this suggested weaving plan and draft on point paper for himself.

(To be continued.)

The Expectations of a College Man.

EDITOR COTTON:

After reading from month to month the discussions on the college man in the mill, following the letter of "H. E. R.," asking for a square deal, I am prompted to give my views on what a college man expects when he leaves school as a graduate.

First of all, he is expecting a place where he can work and learn. He does not expect to leave college and go in a mill as superintendent, nor does he expect to be made general manager of several mills. I, myself, have never heard of a young man leaving school and stepping into a responsible position as some of those who have expressed their thoughts in this discussion. I am a student in textile engineering at Georgia Tech, and have associated with the students of that institution for three years. Never have I chanced acquaintance with one who thinks that when he leaves school he is going to have a place that requires no work and that he is to be looked upon as one "who knows it all." These boys, upon graduation, realize they have a good foundation upon which they can build their future, but that they are still freshmen in the school of experience. They look forward to getting in some good mill where they may get some good practical experience.

I was surprised in "N. F. (N. C.)" thinking he would receive such an ovation when he graduated, and when out

in quest of a place after he graduated in his textile course. I think his school was at fault for allowing a man to leave its doors with such an impression. I do not say that I censure him for the thought, but I certainly do think the school was to blame for allowing him to leave with that impression.

At Tech we are taught that a fellow only gets a foundation from which, by acquiring a practical experience, he may hope to rise in the textile world and be an asset to the ones who employ him. He realizes that at school he gets part of the theory and very little practical work. He is aware that he must get out during the summers and at the end of his schooling and get a lot of practical experience. I don't believe there's a man at Tech who expects such big things when he leaves school, but he does expect that he be given a place so that he may prove his worth and be allowed a chance to advance. To back up my statements I could point out any number of Tech graduates who have left school, and they have all begun at the bottom of the ladder. I have been around to a few of the mills on visits and the managements tell me that they could not get along without these men. They wouldn't tell me that just to flatter the ones employed, for they are paying them good salaries.

Let me say in closing that we all think a lot of COTTON and look forward to each coming issue. To my mind it is the best of its kind published. K. H. (Ga.)

Some Questions on Sizing Methods.

EDITOR COTTON:

I would like to get, through "How Other Men Manage," some information on sizing single 20s warp yarn. To give strength, what is the best starch and compound? How much of each should be used to 100 gallons of water, on the work named, and how long should it be boiled? Does Japanese wax add strength?

I should also like to have the names of some good books for calculating fancy warps, reeds and harness.

M. V. R. (Ga.)

EDITOR COTTON:

In reply to "M. V. R.'s" question, with regard to the sizing of 20s warp yarn and which kind of starch is best, an advance copy of which was submitted to me, I will say that the kind of starch used does not make as much difference as the cooking and application of it. On coarse yarns, such as 20s, a good size can be made with 75 pounds of corn starch, ten pounds of gum tragasol, six pounds of good tallow or other first-class softener such as castor oil, to 100 gallons of water. British or white powdered gum can take the place of tragasol and any good softening compound can be substituted for tallow or castor oil.

To mix the size, run about 40 gallons of water in, put stirrers in motion, then pour the starch in slowly until about 75 gallons of liquor is in the kettle. If tragasol is used it can be put in either before or after the steam is turned on, but if any of the powdered gums are used it should go in at the same time as the starch.

Boil hard for about 15 minutes, then turn the steam off long enough to put in any oils or softeners, continuing the boiling slowly for one hour at least.

Corn starch will penetrate the yarn almost as well as potato starch, it is much cheaper, and takes a little less weight of dry starch per 100 gallons to make the mixing. When being applied at the slasher it should be kept at the highest temperature at which the size will not spatter out of the size box. Run the slasher at a moderate speed, and with as few pounds of steam on the cylinders as will dry the yarn properly.

If applied correctly, the foregoing should add at least six per cent in weight and ten per cent in strength to "M. V. R.'s" 20s yarn.

With reference to his query on Japan wax, I would not advise the use of this on goods for printing or converting. Mack (Ga.)

Suggestions for the Care of Slubbers.

EDITOR COTTON:

In connection with the operation of slubbers, there are several features that should be looked after. First is the draft; it should not be too great nor too low. The sliver, if too heavy, will result in too long a draft; if too light, it will result in too short a draft. A long draft, in my experience, results in uneven roving and yarn, while too short a draft has a tendency to lump and cockle the roving.

In setting the rollers, both top and bottom, I set the back and middle bottom steel rollers to $\frac{3}{8}$ inch wider than the length of the staple, and the middle and front steel rollers are set to $\frac{1}{8}$ inch wider than length of staple—these settings are from center to center. The top leather rollers should be absolutely parallel with the steel rollers and ride the centers of the steel rollers, for best results. The top rolls should not be set so they will rock back and forth, as this will result in cut roving.

A heavy grease of a good grade should be used in lubricating the bearings of the steel rolls, and just enough used to lubricate them. Unnecessary grease is a loss of money and "balls up" the work. (I have seen so much oil and grease in steel roll stands that the leather on the top rolls was soaked and became soft and had to be removed after a few days' running.)

Another big loss of money in oiling results from the method of applying. We should use a patented can, that will let one or two drops of oil on the tips of the roller, and also the center of the roller should have one drop of oil daily.

The trumpet through which the sliver passes should be set, every one of them the same distance from the end of the boss of the roll, and then the traverse should traverse just as far as possible each way and not run the sliver out the sides. The longer the stroke the longer the life of the top leather rolls.

A good grade of flannel should be used on the top and bottom clearers, and it should be replaced with new when so worn and slick that flyings will not adhere to it. Clearers should be kept clean to prevent the flying from being pulled into the clean stock.

Flyers should be kept balanced, and should be of the right weight for the roving being made. The hollow tube should be kept free of chokes, also the nose of the flyer which fits down on the spindle should be kept free of lint, as sometimes lint will throw the flyer out of true. Then chokes should be kept out of the split in the top of the spindle, as this will keep the flyer from properly fitting down on the spindle.

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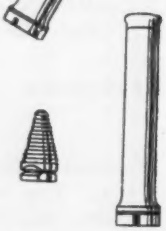

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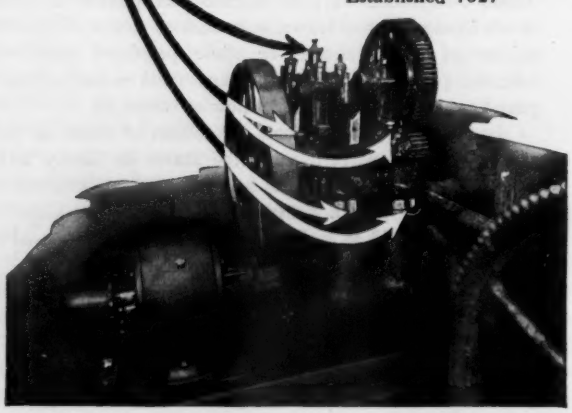

The carriage must be kept in perfect alignment and level at all times, because if it is out of true the machine is in a dead strain and consumes unnecessary power, and the breakages are more. The bobbin and spindle shafts and gearing should be cleaned and new grease put in the bearings every three months, at least. Steps should be oiled every three weeks with a grade of spindle oil, and spindles should be pulled every three months and bolsters mopped out. This will save power, wear and tear on the machine, and prolong the life of the equipment.

The lift shaft should be in perfect alignment and level. On the lift gear or rack gear the set screws should be countersunk in the lift shaft to prevent slippage and throwing the carriage out of line. The weight chains should not be long enough to allow the weights to set down on the floor but not so short as where the weight can come in contact with the stand. There should be a board at the front and back of the frame to prevent the bobbins from rolling under the frame and causing breakdowns.

The jackshaft should be put in line and level, and then holes drilled with an electric drill in the stands and dowel pins inserted sufficient to prevent any slip that might cause a tear-up of the compound. The top cone stands should be treated the same as the jackshaft. The builder and its neighboring parts should be looked after very carefully, the twin gears and twin shaft should act freely and quickly.

The lay gear should be of the right number of teeth to insure a perfect bobbin of roving which will not slough off. The twist should be just enough to unwind itself at the next process and not break back in the creel.

The tension gear will do more harm than would be suspected if not of the proper teeth. It should be changed at once if the ends show any signs of being strained or too tight. The tension should be run just as slack as possible without making a soft bobbin. A. B. (Ga.)

Keeping Records on Loom Supplies.

EDITOR COTTON:

I would like to see some discussion on prolonging the life of a picker check strap on a loom, especially on a high speed loom making, say, 175 picks per minute, on a 28 to 30-inch loom. I have asked many mill men, but none seems to be able to give a definite answer, or one that seems to be in line with the others. The variation of the life as they estimate it seems to be so great that I have cast aside all information I have gotten.

If one will only think of the expense of keeping a loom supplied with leather check straps, he will find that it is near the expense of the shuttle supplies. I've often thought whether it was the fault of the overseer in not fully giving this enough attention, and training his men in the proper way of putting them on to the best advantage in the long run.

I have found in one way of fastening them onto the holders, connecting to the lay, that instead of putting them all the way around the holders they are sometimes put over and under this holder, which makes the strap have one sharp bend, and the picker stick making its stroke one side of the strap which is fastened next to this holder, it cuts its way into the leather more quickly and breaks it in two. This strap should fasten on the outside, making as long a bend as is possible, which enables the strap to check more easily in the full swing of the strap, using a large size washer in fastening the two ends of the strap together.

What are the duties of a check strap on a loom? Can it take care of its duties and not be strained? Should not the check strap be treated more easily, set the power on the looms, or the picker stick, so that it is just enough to make the shuttle make its stroke and land in the box easily without the usual slam, and bouncing tendency of the shuttle, setting the boxes up so that the shuttle will go in and out without requiring so much power, thus giving the check strap less to do and prolonging its life?

Then let's study the life of the shuttle. How much service are we getting? To be positive, without guessing, what kind of a record do the readers have, to make sure they get the correct report on the shuttles? For two years I have been keeping a record that I can depend on. It is to take stock on the first day of each month of the shuttles used, then add those received that month, with what I had the previous month, subtracting those used, and the difference should be in stock. Oftentimes we fall short a few shuttles; some get out by sleight-of-hand, but we keep a very close tab on them, and my shuttles average around 14 months of service each.

I was talking to a very well posted man a few days ago and he told me he had a man to tell him he was getting 24 months to the shuttle. That sounds extraordinary. He asked the man what system he used. "Why," was the reply, "we keep a record of every one that goes out of the supply room." On being asked what his monthly shipment was he said he did not have one, as he bought enough shuttles during the war to last him a while yet. So there you are! Almost no system, and he really didn't know, but was pacifying himself with the information that came from his supply room, instead of taking stock every month and checking the difference.

Now about lining the crank shafts. When a new one is put in, do the readers line each time? They may not need it every time, but they ought to be examined every time to see. Anyone knows the advantage of having every shaft in line. I think it is of the utmost importance that the shafts be tested when one is replaced, and also the lays should be lined, tested as often as is possible, and especially every time a new shuttle is put in. Care should be taken that the shuttle goes in and out of the boxes as it should. The picker should be set exactly true, and made to strike the shuttle-end clearly, and not have a tendency to lift or pull down the shuttle in making its stroke.

I would be especially interested in some correspondence along this line, and I am sure it would create as much enthusiasm as does all our other correspondence. We have been mostly on carding, spinning, slashing, etc, and now suppose we chat a while about the loom, its duties, and especially on keeping down repair bills as much as possible, prolonging the lives of parts, and giving remedies for repairing the different parts of the loom. How it is done, and what parts can be successfully repaired when either broken or worn?

I have been repairing the worn and broken-out bobbin support stud holes in the hopper stands on the loom, by putting a round stick of carbon in the holes that fits it and building up around it with a welding torch (oxygen), being

careful not to make the metal too hard; then when it gets cool I dress it down to the right shape for the support, and thus save the price of a new hopper stand. Some use a patent bobbin support patch, but I never could get the results I thought I should have with this, because it is invariably necessary to cut down, or make an extra hole for this patch, and when it is done, the patch is still there. In building it up with a welding torch it can, by practice, be made to look as it did when new. When finishing one up I always clean it up and repaint it, and this gives it the appearance of one just from the manufacturer.

The swords can be repaired when the crank arm pin holes wear or break out. This is done by fitting a carbon pin in the hole and filling around the pin. I also have a templet that fits the swords in case I have one broken. This is made so that it fits in the holes at each end of the sword and holds the sword absolutely in its original shape and when this is repaired it should be painted also. I have had it told me that it costs more than it saves, but that comment came from men who had had no experience with a welding outfit. I believe that when once a man owns one, and teaches a man who takes a pride in his work to operate it, he will consider it invaluable. But care should be taken that the right kind is used, one that is best suited for the particular work. M. P. R. (Ga.)

A Chronicle of Textile Machinery.

A most informing brochure has recently been issued by the Saco-Lowell Shops in commemoration of the 100th anniversary of the organization as textile machinery manufacturers. Founded in 1824, this organization celebrates this year the rounding out of a full century of continuous business and progress, a history that is almost a parallel of the development and growth of the cotton manufacturing industry in America.

The booklet dealing with the development of this well known concern is very attractively prepared and printed, and contains over eighty pages of interesting material charting the growth of the organization. An introduction deals with the development of textile machinery from the beginning of history to the present time. A separate section is devoted to each of the organization's shops—the Lowell Shop, the Newton Shop, the Biddeford Shop—telling how each of these now extensive units have been developed from small beginnings.

A chapter dealing with the contributions made by America to the mechanical developments of textile machinery is most instructive as pointing out the part the United States has had in the later refinement and progress of the industry after the development of industrial life in this country.

The final section of the book tells of the service of these shops in foreign countries.

All in all, the book is truly "A Chronicle of Textile Machinery," and in addition to its interesting reading material, which indicates much research and investigational work in its preparation, it is profusely and fittingly illustrated throughout with attractive halftones, showing in comparative manner the development of machinery, general views of the plants of the organization, and other interesting textile illustrations.

A Problem in Proportion.

EDITOR COTTON:

Most readers of this department no doubt have heard of the cone driven fly frame. This feature made the bobbin-lead fly frame almost perfect. When the flyer-lead system was rejected, it made the invention of the new differential possible. The new differential was a great idea for the makers of cone belting. When the first differential was invented, I am told, the inventor was so pleased when he found the scheme would work, that he turned hand spring somersaults.

But I would like to have some of the readers make the following clear: Let us assume that one revolution of the differential sleeve will wind three inches of roving when the frame is stopped, by turning the bottom cone by hand. When the bottom cone is raised, no winding is possible and the spindle and bobbin revolve at the same rate of speed. So, no matter how slow or fast the frame is driven, we must drive the differential sleeve at a speed greater than that of the driving shaft. How can the driving shaft aid the cone belt, when the cone must drive the differential sleeve at a speed in excess to that of the driving shaft?

Ever study proportion? Mill men call it the rule of three. Figure this out. When the bottom cone is raised, the spindle and bobbin rotate at the same speed as stated. Then if one revolution of the differential sleeve will wind three inches of roving when the driving shaft is stopped, how many inches will be wound if the differential sleeve makes one revolution when the driving shaft is up to speed?

Wash (Mass.)

Long and Short Card Drafts.

EDITOR COTTON:

In the December number, "A. L. J. (S. C.)" wants to know if doubling the weight of a sheet of lap and also the draft of the card will increase the breaking strength of the yarn. My answer is "No."

We hear very little from the long-draft boys here lately. Maybe they have seen the kindly light from our previous discussion.

Let "A. L. J." make the following test: Take one bale of cotton and make four or five laps of 15 ounces, and four or five of 30 ounces. Keep them separate and run both through every process under exactly the same conditions. Then break the yarn, and he will not only want to come back to the 15-ounce lap, but he will see from the above test such an advantage in the light lap that he will reduce his lap yardage to 11 or 12 ounces to the yard.

If "A. L. J." ran a lap through a card having no draft, the stock would be just as coherent in front of the card as at the back. The minute the draft is increased, the more fluffy the stock becomes—which is termed waste. There is no argument, I hope, regarding this statement. Therefore, it should be clear to "A. L. J." that a long draft on a cotton card takes the life out of the fibers, or in other words, a long draft allows the fiber to remain under the action of the licker-in teeth for a longer period, which robs the fibers of their waxy walls and makes the stock much less coherent. However, he should make the test outlined and be convinced. Wash (R. I.)

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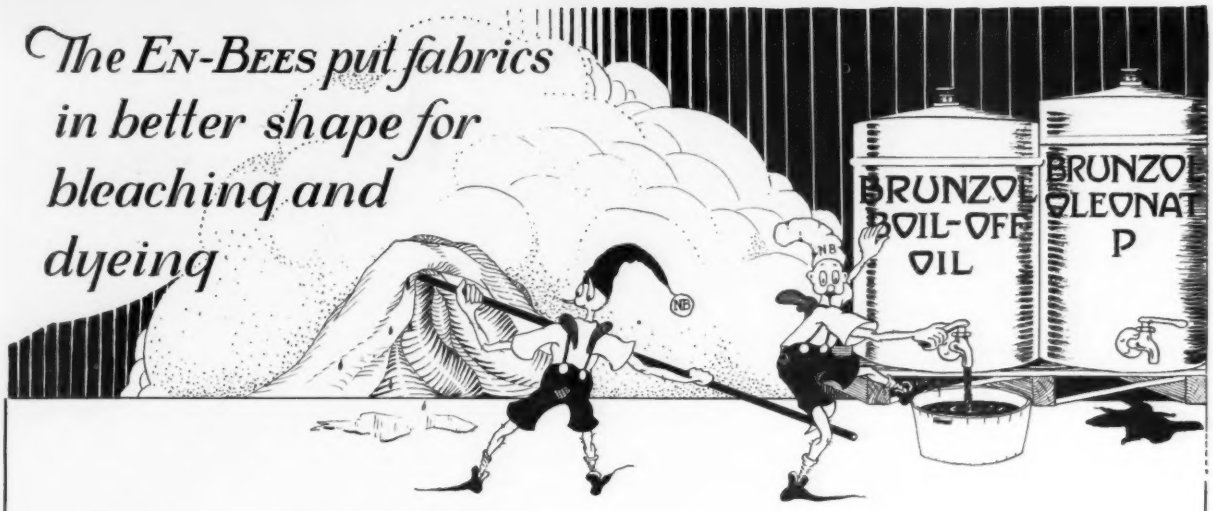

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A Beltless Speeder Mechanism.

EDITOR COTTON:

Several months ago "Wash" asked, "Is a coneless speeder possible?" I am sending you herewith a drawing showing a speeder mechanism invented and patented by Marvin K. Ballard, of Belmont, N. C., who is connected with our mill. Mr. Ballard points to the fact that his invention effects the change of speed desired without the use of a belt, although it does use a cone. A description of his invention, in connection with the drawing herewith, follows:

The vertical shaft *A* carries a beveled gear wheel at its top which meshes with a similar gear wheel on the upper horizontal shaft *B*, the upright shaft passing through the bearing swung on the horizontal shaft as shown. A collar, which is rigid with the shaft *A*, rests against the surface of the central portion of the hanger.

Keyed to shaft *A*, near the bottom, is a pinion *C*, which meshes with the pinions on the inclined shafts *D* and D_1. These inclined shafts each carries a friction wheel, *E* and E_1, which are slidable but not rotatable on the shafts and which are mounted between the adjacent arms shown. These wheels cooperate with the cone *F*, which is loosely journaled on the vertical shaft *A*. Also loosely mounted with reference to the shaft *A*, but rigid with the cone, is a gear wheel meshing with another gear wheel on the lower shaft *G*.

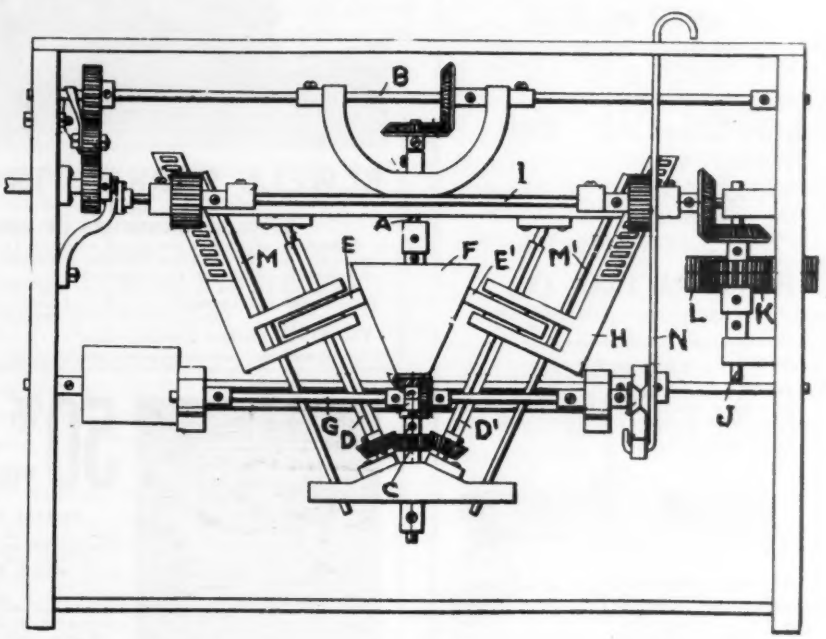
It will be observed that the result of this construction is to permit the shaft *A*, through its pinion gears to drive the inclined shafts, the friction wheels and the cone, the speed depending upon the position of the friction wheels on the cone. The cone of course drives the shaft *G* through the gearing illustrated.

In order to effect the required change in the position of the friction wheels, these wheels are shifted by means of the rack bars *H*, with which are meshed the gear wheels on the shaft *I*. The beveled gear on the end of this shaft meshes with the beveled gear on the vertical shaft *J*. The gear wheel on this, *K*, is controlled by the tension rack *L*. Coiled tension springs (not shown) are connected with a transverse bar and one of the lateral arms of each shifting device, controlling the position of the friction wheel on that side of the machine.

Inclined guiding rods are shown as *M* and M_1, these rods passing through apertures in the laterally extending arms of the friction wheel shifting devices. The shaft *G* passes through a bearing and a bolster apertured for the shaft *A*, the gear and cone and bolster having their downward movement limited by a collar directly above the gear and connected therewith.

On the end of the shaft *G* is seen a grooved wheel, and a swinging arm engages the under side of this wheel and is connected with the rod *N*, by means of which the swinging frame mounting the shaft *G* may be elevated or swung for the purpose of changing the vertical position of the cone.

What does "Wash"—and the other readers—think of this? Bab (N. C.)



Setting the Rolls.

EDITOR COTTON:

I wish to give "W. T. M. (N. C.)" a few suggestions on his question of the best setting for rolls, as asked in the December issue. His question is not quite definite enough for a detailed reply.

On drawing frames I always run the rolls as close as I can, that is, on ⅞ to 1-inch stock, with 1⅜-inch front rolls, making it so that the stock is not injured in closing the rollers. I think his speed of 348 r.p.m. is too high; he should run them at 300 at the highest, 275 really being best. He could increase the draft between the second and middle rolls, so as to not allow the first and second rolls to do all the drawing out of the stock.

On the other frames, where he has 2.00 and 1.40 hank roving, the speeds of 160 and 180 r.p.m seem to be about 15 per cent too high. For good yarn the speeds must be as low as possible and keep the other machines supplied with stock.

On the 1⅛-inch rolls I would suggest the same setting—

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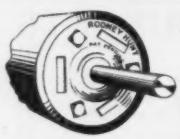

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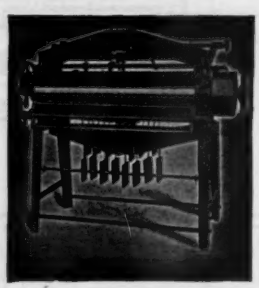

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that is, as close as they will stand without the rolls rubbing one another, after escaping the length of the staple. This can be tried in spinning as well as drawing, increasing the break draft between the back and middle rolls, helping to draw down and at the same time giving a slight increase in strength. This has been tried out on several spinning frames and found to run some better and increase the breaking strength. This was done by classing the yarn as a "special" and letting it go by one route through the warper room and telling the operative to watch it carefully and report the results, which have been in favor of increased break draft on the back and middle rolls. T. A. D. (Ga.)

Versus the Employment Office.

EDITOR COTTON:

As was pointed out in a recent issue of COTTON, there is no calling on earth that so completely provides opportunity for individuality as the cotton mills of the South. "I'm off to the big textile show in Boston," wrote a prominent mill man recently. "Got to get some fresh ideas; mine are getting stale and musty. Come with me and let's wake ourselves up."

It is a fact that the brilliant and active minds avail themselves of such opportunities. This is very largely the secret of success in many organizations. In the Southern Textile Association, and other organizations, the mill owners, their managers, superintendents and overseers swap ideas and discuss their mutual problems from every angle. The monthly community meetings at the mills and the debating on textile subjects also aid in this furnishing food for thought. And some apparently timid folks often bring surprise with their brilliant rapid fire questions and answers, for when men get together and thrash out a topic, thoughts leap out spontaneously from some chance reference or allusion, which are quite aside from that which was said intentionally or with set purpose.

Some may object on the ground that so many various points of view are presented regarding the same subject—it is that same narrow attitude that has kept and is keeping many otherwise good men out of a better job. The fellow who says, "I am contented to let well enough alone" is surely approaching the danger signal of failure.

The letter on "The Employment Manager," by "H. H. H. (Ga.)," in the November isssue of COTTON, provokes these thoughts from me, and I am going to ask for the opportunity of airing my thoughts on this much-discussed subject.

In railroading, telegraphy, iron working plants, etc., where virtually all wages are on a fixed scale—often determined by a labor union—there is no objection to the employment manager, perhaps, but with the majority of southern textile plants, the interests of the operatives and owners and managers are mutual and are so accepted by most of the workers. Occasionally some executives find —or think they do—need for an employment office, when as a matter of fact, a well-trained superintendent or a staff of competent overseers is what is needed.

The welfare of the human factor in industry has long been the paramount issue with progressive management, although unending search is ever being made for materials and modern machinery to assist human hands in producing more quantity and higher quality. Such management has been crowned with success that marks it as the strongest competitor in the markets, and the end is not yet. And in this achievement an employment office has had a very small part. Teamwork, science and perseverance have brought us safely thus far, and this, with the essential ingredients, will take us safely on.

Surely conditions as outlined by "H. H. H." do not exist today except in isolated cases. In modern mills the competent superintendent and frequently his overseers are being called into meetings of executives regularly, and a great many of us hear, from the lips of officials who are on the level, just how the organization's financial sheet is paying a dividend—minus the item of salary for employment manager.

The place of superintendent or overseer of a department is one of honor and trust. Any man having meritoriously attained this confidence may well be proud of his ability, and should be allowed the very essential privilege of hiring and dismissing his own help. As for me, I cannot imagine any stronger forced cooperation than having those for whose every act of service I am held responsible say to me, "You didn't hire me, and you can't fire me until someone else speaks," or my saying to those who have been engaged for me by others than myself, "I was skeptical of your ability and didn't think you could handle this job when the employment manager secured you. Come on, let's go see him and get transferred."

Why, all this labor turnover business requires is the services of a well-trained mind possessing all the elements necessary to a shrewd practical manager, superintendent or overseer. Anyone of these could supply abundant help for a modern southern mill, and apply the required discipline, leaving the welfare—when not actually under his trained eye—in the hands of an experienced, Christian community worker whose services are indispensable—and let the product of the technical training institutions fall in line and rank as overseers, superintendents and agents, provided the details are not too strenuous for some who venture.

The principal of one of the South's leading textile schools recently remarked to an advanced student that a most surprising thing was that only about 50 per cent of those graduating from this institution actually engage in the work; some go into architecture, some into engineering; while others take a total departure from their training. When asked for an explanation, this educator said he didn't know, unless the details were too strenuous, or the compensation less than in other fields.

I have served as overseer in a large textile plant where an employment manager was engaged, and I say that more employees were engaged and dismissed in the same number of years than any two plants in the South using a like number of workers, and several times the number of overseers.

And in spite of an effect like this, the employment office manager exists as an open door to transients. If the mills are to be manned by efficiency experts and employment managers, where do the superindents and overseers come in? All of us cannot hope to be managers, superintendents and overseers, and by no means are all now in these positions 99 per cent efficient, but the mill owners have the same source of supply to draw from, as suggested for training employment managers. Successful men are

agreed that individual responsibility is the most effective incentive to a man. Heads of departments are loath to part with experienced, well-trained operatives, and will use all influence to retain them and get others advanced to the same level of efficient service. Many have their applications pigeon-holed; and advancement of those in line is far in excess of the probable need, and this is an asset to any man hiring labor, especially when he is known in a community, for reference to his records will prove the imported operative is seldom a sticker. I dare say that the method of hiring at the gate—or at least having the overseer interview the prospective employee—is a better one than having the entire aggregation shoved into the department through the employment office, only to pass out soon by way of the pay master's window.

Efficiency is the first word in success as applied to textile plants, and it must be admitted that rarely two people perform the requirements exactly alike, however much the training, and although taught by the same teacher with the same methods. Both may be similar as to results. The successful overseer realizes this and will not continually stand over help with a stopwatch, taking count of actions to determine efficiency. The superintendent has informed his overseers what is expected of them in just one word—results—and will not allow usurping of his authority by anyone. Efficiency engineering is by no means a new invention, but rather is being improved upon by progressive ideas and methods among those in outstanding prominence. The labor situation is receiving a major portion of attention. Why is it? Large recreation buildings are springing up, and places of amusement are keeping pace with the installation of modern equipment. The shrewd manager has realized that to get the best service from human hands and minds they must be kept as contented and satisfied as possible, and in most every textile town and village we see the hand of industry at work bringing conditions up to concert pitch, and today the southern mills are not yet dominated by a foreign labor element. Labor unions have been failures, and the southern native operatives are going ahead in loyal, efficient service as no other class of workers, while the superintendents and overseers are burning midnight oil in an effort to improve their mental and technical ability to lead the procession to higher ground.

Many may go through life with a wrong belief and have some success but the things that really count are not always measured in dollars and cents. The shirt-sleeved overseer who can produce interested co-workers for his department, and command their love and respect, is worth his weight in gold to his employer. W. V. J. (N. C.)

Why is Mule Spinning Being Supplanted?

EDITOR COTTON:

The department in which I am most interested—that of mule spinning—seems to be going out, or taking a secondary place. I rarely see it treated in COTTON. Can anyone tell us why cotton mule spinning seems to be giving place to ring frame spinning? I am fully aware that mule spinning is much more difficult to handle and manipulate successfully and to the best advantage, and that may be a good reason for its passing out. However, it seems to be more of a success in England than in this country. If any of your readers have any opinions on this that would be of interest, I should be very glad to see them published.

J. R. (Pa.)

A Special Cone Belt for Fly Frames.

EDITOR COTTON:

For the last few weeks I have been testing a new cone belt. It is a double belt; the inside measures one inch in width and the top or outside measures two inches in width. I find this belt the best in all my mill experience for this purpose, and the inventor or maker must have the same opinion of the bobbin-lead frame as that of the writer. That is, he knew that the cone belt carries the full load of winding the roving on the bobbins.

The cone belt of a cotton roving frame is its most essential feature, as upon it depends the perfect winding of the bobbin, and the narrower the cone belt, the more accurate the outlines of the cones obtained, because it aids in holding the relationship between the cones and the flyers. As the working surface of the belt is only one inch, it removes the friction that is found with a wider cone belt. The more friction on any cone belt, the more the slippage, and the more slippage the more unequal conditions are caused. Let us assume that a cone belt occupies ¼ of the working area of the cones. In such a case, a dual operation would be created that would make winding impossible. However, it proves that the narrower the cone belt is, the more perfect the intermediate speeds.

Running a narrow belt is not a new idea, but the objection was it was too weak to carry the load. Besides, new guides had to be cast. Next, one inch cone belts were used in tandem, as it was known in those days. One belt would ride the other, the inside belt was slightly slacker than the outside belt. The idea was that besides being an aid to the belt on the inside if it should break, the outside belt would save the ends from coming down. It is well known among the old-timers that it was a failure. However, with this belt which I am describing, you obtain the true outline, which means a more perfect wind, and you have a belt that has double the strength of any other cone belt. Another feature I like about it is that this belt is endless and the outside wide belt holds it in position at all times during winding. The least lateral movement of the cone belt affects the winding.

In finding the true outline of cones, each layer must be considered separately and the diameters of the cones figured for that layer alone. Cones should be looked upon as so many separate pairs of pulleys connected together in a continuous string. Therefore, any slight lateral movement of the cone belt must affect the winding.

Wash (R. I.)

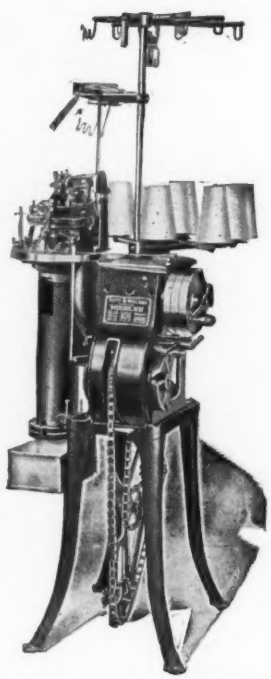
J. A. ASBELL, formerly at the Langley Mfg. Co., Langley, S. C., has been made manager of the Greenville Cotton Mills, Greenville, N. C. He is succeeded at Langley by W. R. McElveen.

E. H. ROGERS has become agent of the Fulton Bag & Cotton Mills, Atlanta, Ga., succeeding A. F. Macintyre, resigned. Mr. Rogers has been superintendent at the Riverside Division of the Riverside & Dan River Cotton Mills, Danville, Va.

KNITTING SECTION

NEW MODEL H-H

Producing Ribbed Top Half Hose Complete



Ribbed top made on two sets of needles.

Automatic transfer from ribbed stitch to plain.

Eliminating necessity of skilled help.

Saving of raveling waste which occurs when topped by hand.

Each stocking is dropped from the machine when finished.

Each stocking is automatically started upon the empty needles, producing a French welt without drawing thread or cutting, no ends of any kind to be removed.

Machine is fitted with five yarn fingers.

Provision is made for high spliced heel and double sole.

Provision is made for ring top and ring toe.

Needles without rivets or latches.

Speed of machine about the same as Model K.

Production about twelve stockings per hour on 3¾" 220 needles.

One operator can take care of the same number of machines as Model K.

The machine is built in all gauges.

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A yarn cannot be higher in quality than the quality of the raw stock used in its manufacture.

Many a wonderful feat has been accomplished in textile manufacture, but we have yet to discover a man who could produce a good 70's yarn out of cotton that should not be spun finer than 40's.

For Quissett yarns we make our selection from the best of the world's cottons. Before grading and mixing the stock, the requirements of the yarn to be produced are carefully analyzed and tabulated.

Carded and combed Cotton Yarns in all Numbers and Descriptions.

Ply Yarns our Specialty. Egyptians, Sea Island, Peelers, Sakelarides.

Quissett Mill

New Bedford, Mass.

Wm. M. Butler, President; Edward H. Cook, Treasurer; Thos. F. Glennon, Agent

QUISSETT MEANS QUALITY

Knitting Yarns

BY WILLIAM DAVIS, M. A.

The yarns used for knitting are subject to constant change in regard to the materials of which they are composed, new features of spinning and preparation and the blends of different classes of fiber come to the front from time to time. There are, of course, standard grades of knitted goods, footwear and underwear which remain much the same from year to year and which form the bedrock of the industry, but the industry is becoming increasingly sensitive to the changes and vicissitudes of fashion. In the realm of raw material it would be difficult to mention any types which do not find a place in the productions of the makers of knitted goods.

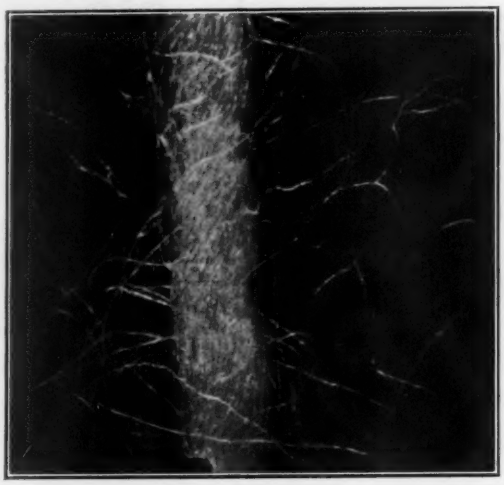


Fig. 1. Photo-micrograph of a single Cotton Knitting Yarn.

One of the staple types of yarns used for knitted fabrics is given herewith in Fig. 1, which represents a cotton yarn spun open in appearance and intended to be used for the underwear trade. It is round in character and the constituent fibers are loose and open, this giving a type sought for in an underwear yarn, namely, that of porosity or openness. This yarn further lends itself to the action of the brushing machine as the staple is long and the character of the thread allows for a pulling-out of the material without excessive breakage. The cotton fibers can be distinguished in such a thread by the curious angular disposition which the projecting fibers assume whilst the contortions can also be recognized in the individual fibers of the yarn. The thread is combed and it is remarkable that the feeling for combed yarns is increasing in volume, the carded varieties allow of shorter types of cotton being worked, but in general the combed thread is preferred as it gives a more finished appearance to the fabric and yields a symmetrical result in loop formation.

This type of thread is largely used for goods which have their fiber raised to the surface with a finish imparted in such a way as will give a woolly appearance to the cloth and so successful have the makers been in such fabrics that many are bought by the customer in the belief that they are composed of wool. When raised and finished in this way the cotton fiber gives an extremely soft handle as compared with the cold handle obtained when the thread is hard twisted as is required for the trade in woven goods.

There has been a considerable improvement in the kind of yarns delivered to the knitting manufacturer during the past few years as compared with those the manufacturer was compelled to accept during the war and in the first post-war years. Owing to scarcity of yarns and their high price manufacturers in the period referred to had to accept any kind of thread and be thankful and the ordinary standards of spinning were obscured in many cases. Some of the preparing operations dealing with the thorough cleaning of the fiber and yarn were omitted to secure higher production and the style of the yarns supplied suffered marked deterioration at least on this side of the Atlantic. During the same period there was an influx of partially skilled labor into British mills, these having to be hastily trained for the emergency, learned their duties imperfectly. There was a further factor peculiar to the spinning industry and that was a series of labor disputes in the mills over the wage question which unsettled the minds of the operators and caused them to lose interest in their work. The skilled yarn spinner has his moods and if he is upset or troubled in his mind it affects his work in the factory. Under the increasing competition of recent seasons, the spinner has been hard pressed to reduce the price of his

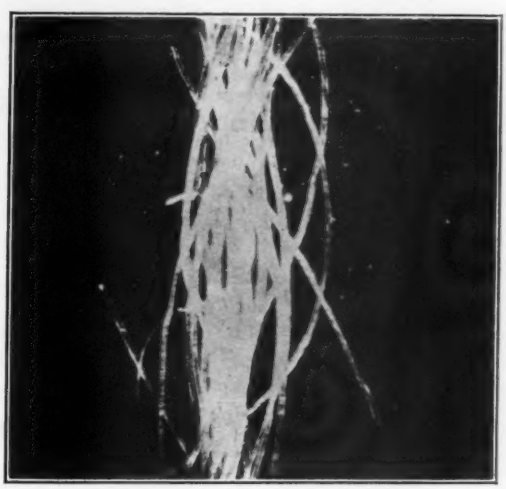


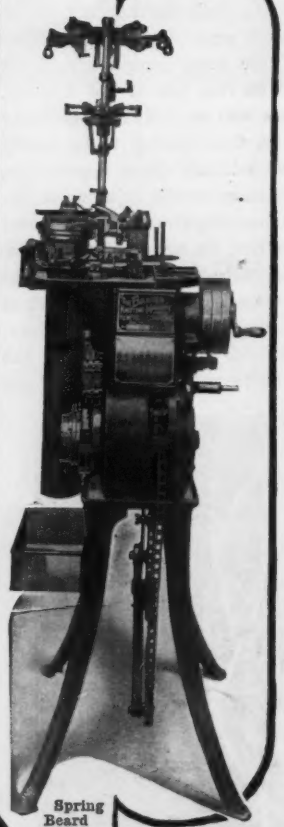
Fig. 2. Combed knitting yarn from half-blood sheep.

yarns and in many cases this could only be done by a corresponding shortening of the routine through which the material must pass if it is to be regular and round in form. When the number of doublings is reduced, proper evenness becomes a matter of greater risk, and uneven yarns give very unsatisfactory results in finishing, particularly if the goods have to be brushed when the thicker portions of the thread are caught by the easles and the thin parts missed, a proceeding which more than ever accentuates the uneven character of the fabric.

Coarse cottons, dry in staple and irregular in length, cannot give satisfactory results in the knitted fabric be-

The Banner

Full Automatic Hosiery Machines



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Speed
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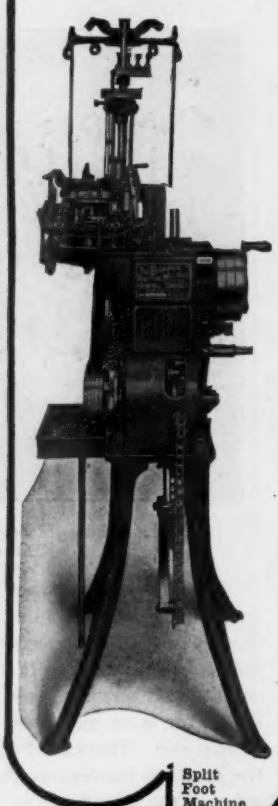
All Parts Accessible from the Front of Machine

We have just placed on the Market two new models– The Spring Beard Needle, built in sizes of 3" to 3 3-4" diameter, and a new model –Split Foot Machine, built in sizes of 3 1-4" and 3 1-2" diameter.

Write for descriptive catalog



Split Foot Machine

HEMPHILL COMPANY

MAIN OFFICE AND FACTORY PAWTUCKET RHODE ISLAND

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cause before the stitch can be well rounded off the material should possess internal elasticity and yield of its own to come to the aid of the knitting process. This point may be illustrated by the photo-micrograph shown in Fig. 2 which gives a single woolen thread largely used for the cheaper grades of woolen underwear and footwear. The fiber is a crossbred or half-blood as obtained from New Zealand and the composition is Lincoln and Southdown wool types. The material is strong and of excellent resisting property as regards wear whilst the fiber lends itself to successful treatment in combing. In this case the staple length is about 6 inches, which proves too long for successful loop formation; these long fibers being combed straight one with another cannot be curved into symmetrical and shapely loops so that the fabric becomes distorted in its stitch formation, a blemish which is accentuated when the fabric is scoured, showing in a series of loops leaning to the left followed by a series which incline to the right.

Cotton yarns, owing to their strength and durability combined with their small relative diameter, are largely used in the foundation of fancy fabrics and novelty yarns.

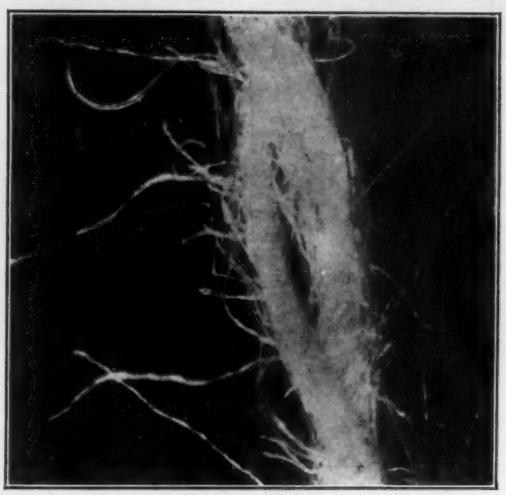


Fig. 3. Knitting yarn composed of cotton blended with wool and then folded with a pure silk thread.

In recent months there has been a revival of "knop" yarns in the knitting industry as well as curl fabrics, and in all these we require a sound reliable thread of moderate price to constitute the ground over which the more showy materials are arranged. There is, further, an important use for cotton when mixed with wool, silk and artificial silk and it is interesting to examine the reasons for such a choice of mixtures. When cotton fiber is mixed with wool, the finest grades of wool delaine are selected so that the object of the mixture cannot altogether be a matter of lowering the price of the garment since lower grade wools could be obtained at less money. The object in such a mixture is to fuse the properties of the wool with those of the cotton, the cold handle of the cotton is helped by the warmer feel of the wool, the crispy and raspy sensation experienced when wool touches the skin is counteracted by the use of the smoother qualities of cotton. Cotton is less absorbent as a material for underwear and this is neutralized by the greater absorbency of wool.

Following similar principles we can explain why cotton is found with silk in some varieties of goods. Silk by itself is an excessively expensive material and to make up a garment wholly from it renders the final cost too great for the vast army of wearers to whom the ordinary manufacturer has to look for the trade of his firm. Fig. 3 shows an interesting example of the three basic fibers being used

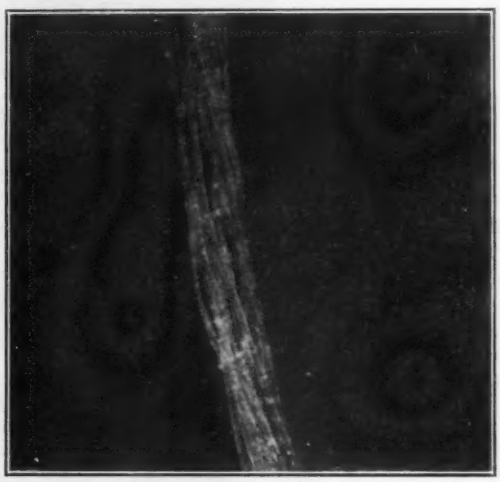


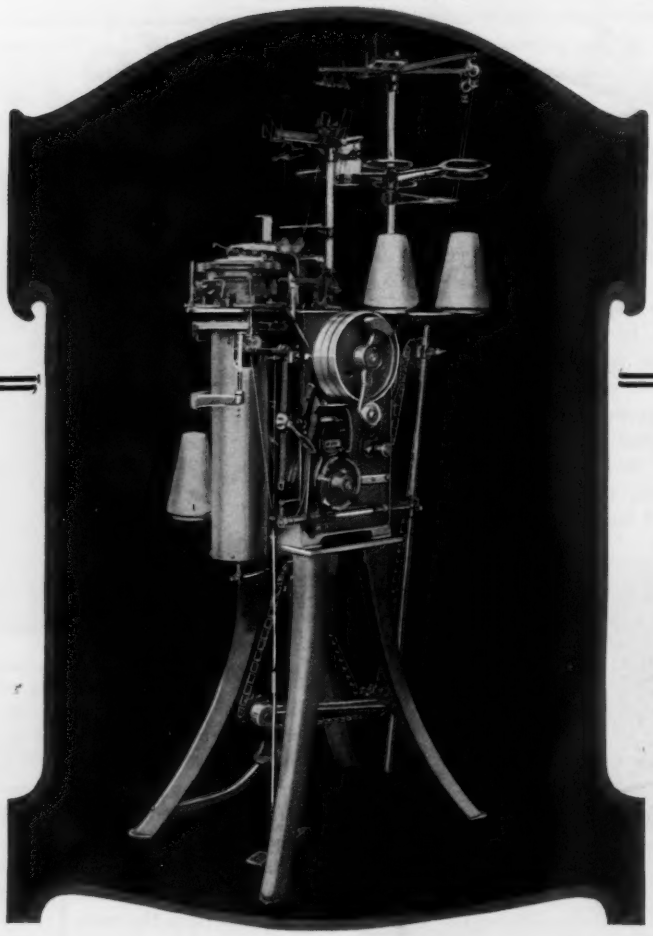
Fig. 4. A single thread of artificial silk for knitting purposes.

in one and the same yarn, the opener and thicker thread being composed of a mixture of cotton and wool fiber with fiber, and the denser thread being of pure silk. The mixture shows its constituent fibers plainly in the projecting material where the cotton members can be recognized by the twisted and contorted form well known as being the structure of this material, while the woolen members are recognized by their round graceful way of curving as they stick out from the yarn.

Recently there has been a very decided advance in the use of artificial silk and this fiber is being gradually em-

Fig. 5. Silk and Wool yarn produced by mixing the materials fiber with fiber.

ployed for all the purposes of real silk and a good many more for which real silk has been found too expensive. This extended use along with the recent fall in price of artificial silks, due to increasing competition, bids fair



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to react very adversely on the demand for pure silk as obtained from the cocoon of the silkworm which is the generally accepted definition. More than that, the reduction of price means that it will be employed in increasing quantity for all purposes of knitted goods. Fig. 4 gives a view of a single thread of artificial silk composed of about a dozen filaments of the material formed into the yarn. The structure is perfectly plain and the filaments continuous and straight.

In recent seasons there has been a constant increase in the use of this material and it has come to be associated with the most promising developments of the industry. The usual range of counts is 52s cotton to a yarn equal to between 1s and 2s cotton counts. The use of this material is in many districts bound up with the Continental sys-

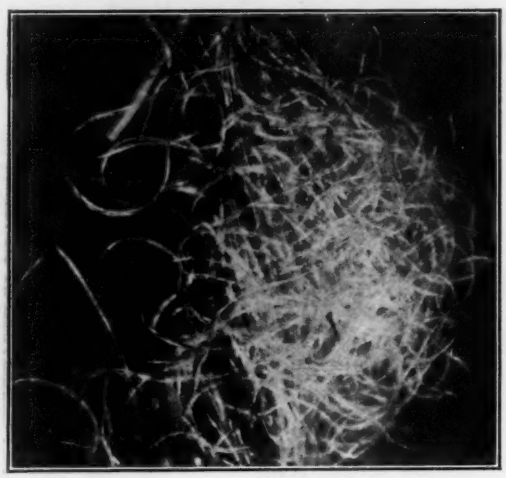

Fig. 6. Fancy "Knop" effect produced in a yarn by variation in twist.

tem of denier counts which is equivalent to the number of deniers which 520 yards of this material weighs. A useful conversion factor to have in this case is 5282.5 for if the denier number be divided into this it will give the equivalent in cotton counts, while if your requirement is the deniers number for a known count of cotton, this will be obtained by reversing the process and dividing the cotton number into the constant just referred to. 100s denier will thus be equivalent to $5282.5 \div 100 = 52.8$s counts cotton. The material is folded many times over to produce threads suitable for knitting ladies' garments by hand and machine and numbers as high as 3,000 to 4,000 deniers are used in this connection. 4,000 denier would thus be equivalent to $5282.5 \div 4{,}000 = 1.3$s cotton counts, a stout enough thread in all conscience. When the numbers come to be as thick as this it gives an opportunity for the operations of the hand knitter, and the domestic felicity of many a home has been disturbed by the endeavors of the lady of the house to knit a jumper or blouse for herself in artificial silk.

Without going into the chemistry of this material, which is done in a number of textbooks, it may be of interest to state that the different types may often be distinguished from each other by the simple test of applying a match and noting the manner in which it burns. One type of artificial silk, which enjoys a large popularity, ignites with a sparkle and burns with extreme readiness. In the process smaller pieces of the material become detached from the burning mass and go off on their own in a series of miniature explosions like small bombs. Another competing form of artificial silk when ignited burns slowly and merely curls itself up into a tarry mass forming dark brown or black beads of molten matter which spreads itself on the floor. It is often difficult to tell the difference between various grades of this material by inspection alone and the application of the burning test in the manner indicated will prove a very useful method and one which can be quickly performed by the unskilled.

It is well known that in the manufacture of artificial products on the knitting machine a considerable amount of waste is incurred owing to the slippiness of the material and the ease with which it becomes entangled when issuing from the bobbin. An active trade is done in this waste which is afterwards teased up again and used along with wool mixed fiber with fiber, the result giving a subdued effect of luster at a reduced cost as compared with the first product. Fig. 5 is given herewith to show the result of mixing silk and wool in the manner indicated, the woolen elements are shown and recognized by the relatively coarser diameter of the fibers while the silk filaments are readily noted by their fineness in comparison. Such materials have been largely used and widely advertised in the American market and have experienced a rapid growth in popularity for goods of moderate cost. This trade has also proved

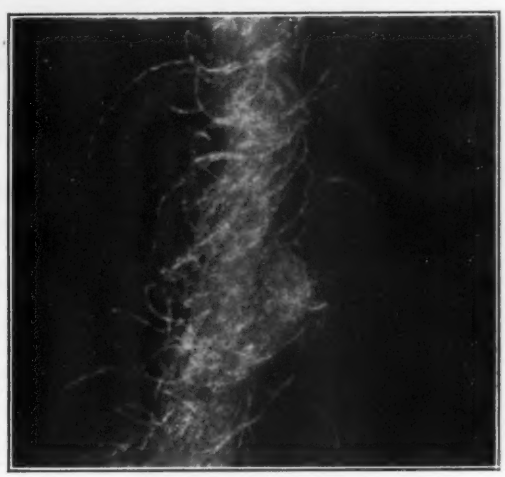

Fig. 7. Small "Knop" effect produced by dropping neps of material into the yarn dur-ing carding.

an advantage to the maker of artificial silk goods at first hand as they have found a profitable outlet for the considerable amount of waste material.

The winding operation has been a great defect and the cause of a large proportion of the waste up to the present but the makers of winding machinery have given the matter their closest attention and various types of very successful machines are being brought to the market which wind the material from hank with a small percentage of waste. Many of the artificial silk and wool, or the artificial silk and cotton folded yarns have preserved the silk in white form but this is by no means the rule today. Artificial silk yarns are being dyed in many different colors and folded with each other to produce marl yarns of great beauty and luster. Very brilliant effects have been avail-

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And Needles That Are Nit
Too many people nowadays know the Price of everything and the Value of few things.
When it comes to Knitting Needles the value of the product should be determined by the Quality and not the price.
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Of course there may be larger manufacturers of Latch Needles, but remember that Radium has far greater possibilities than coal.
Just write for samples of Caw Brand Needles and prove it to yourself.
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able from the rainbow colors applied to this material and the results have given an impetus to the fancy trade by reason of their attractiveness and brilliance.

There is at present a recrudescense in demand for fancy yarns of all kinds for knitting purposes, this being chiefly directed to the production of the knitted dresses and costumes which have become such an important feature of our clothing economy. The simple marl yarn changed into the fancy effects and now there is no kind of novelty but may not be utilized in the knitted texture. Fig. 6 gives a view of a fancy effect produced in a woolen yarn where the feature is a prominent "knop" effect obtained by causing the twist to enter the yarn in irregular fashion. Thin pieces are made in the thread during twisting and the twist runs into those portions leaving the large parts to yield a "knoppy" effect in the thread. These may be dyed a second color to the ground thread of a marl, the second thread being thinner and affording support to the thicker and more irregular constituent.

Figure 7 illustrates the principle of making a fancy yarn where the colored effect is introduced in quite a different principle. The small neps or knops are composed of waste material or short fibers which are dyed in knots beforehand in appropriate colors. These are dropped into the material as it is passed through the carding machine and then they find themselves attached to the thread in the usual way. They are fastened to the surface frequently with a small amount of twist and may easily be plucked off if an effort be made to do so, but they give a very impressive effect in the fabric, particularly if several colors be employed in dyeing the neps. They are mixed together when being dropped into the carded sheet of fibers when passing through the machines.

Among the Knitting Mills.

The Ideal Hosiery Mills, Elizabeth City, N. C., are considering the rebuilding of their plant which was recently destroyed by fire.

The M. & G. Hosiery Mills, Oxford, N. C., which formerly operated a plant in Burlington, have completed a plant at Oxford and have begun operations, specializing in reworking, dyeing and converting seconds and thirds.

The Paducah (Ky.) Hosiery Mills, Inc., are to erect a branch plant at Benton, Ky.

A new project to be known as the Murfreesboro Knitting Mills, at Murfreesboro, N. C., has been organized by J. A. Campbell, Charles R. Story, E. A. Davenport and E. T. Vinson.

Perry Knitting Mills, Perry, N. Y., are making an enlargement to the steam plant. This new steam plant extension includes two new 450-hp. B. & W. boilers and two Westinghouse new model underfeed stokers.

The business of S. D. Bausher's Acorn Hosiery Mills, Reading, Pa., has been incorporated, and two additional branch plants have been added. The company, Acorn Hosiery Mills, Inc. since January 1, manufactures infants' socks, and several of its numbers have been sold up to April, some recent sales being made at slight price advances. Mr. Bausher is president of the company and his son, J. Lee Bausher, is treasurer. Of its three branch factories, one is in Reading, where is located the parent plant. The two others are in Pottsville and Frackville, Pa. The company now has in operation a bleachery and dyeing establishment in Hamburg, Pa., where cotton yarns are processed for the company and other manufacturers in the Schuylkill Valley. A fleet of ten motor trucks is employed in the transportation of yarns to and from the bleachery and dyehouse.

The High Rock Knitting Co., Philmont, N. Y., leaders among the northern manufacturers of men's cotton fleeced underwear, have added boys' fleeced garments, and also have drifted into the business of manufacturing men's sweater coats. The start in sweaters was made a few weeks ago with two numbers to sell to jobbers at $18 and $16.50 a dozen respectively. The latter is a wool-back cotton garment. One of the complaints of manufacturers who for years have engaged with sweaters exclusively is that too many underwear mills now are making sweaters. The explanation for this is overproduction of heavy weight cotton underwear by northern mills.

The Rockford Knitting Co., Rockford, Ill., has preliminary plans for the rebuilding of the portion of its mill recently destroyed by fire.

The Flushing Knit Wear Co., Brooklyn, N. Y., recently organized with a capital of $20,000, will operate a local knitting mill. The company is headed by E. A. Brown and M. E. Bennett, and is represented by Samuel Brand, 347 Fifth Avenue, New York.

The Nazareth Knitting Mills, Nazareth, Pa., heretofore operated by Fred Wunderly and Robert Gets, has been acquired by Anton Sell, Bethlehem, Pa., and associates. The new owners have plans under way for the organization of a company to operate the plant, located at Broad and South Streets. The structure will be remodeled and considerable equipment installed for the manufacture of knit goods, primarily women's hosiery. It is planned to have the mill ready for service at an early date.

The City Knitting Mills, New York, recently organized, have plans for the operation of a local plant for the manufacture of a general line of knit goods. The company is headed by A. Seligman and C. Hertzig and is represented by Joseph Lew, 299 Broadway, New York.

The Paterson Mutual Hosiery Mills, Inc., Paterson, N. J., recently organized under state laws, with a capital of $2,500,000, is taking over and merging three knitting mills in this section, comprising the Hugo Huettig Co., Paterson; the Paterson Knitting Mills, Inc. Ramsey, N. J.; and the Mutual Hosiery Mills, Inc., Philadelphia, Pa. The new company has plans under way for considerable expansion and purposes to increase the output at the different mills. Hugo Huettig is president of the new organization. Reinhard Huettig and Emil G. Kattermann are also officials of the company.

The Thomas Reifsnyder Hosiery Mill, Lancaster, Pa., has preliminary plans under way for the rebuilding of the portion of its local knitting mill, recently destroyed by fire, including equipment.

The Taubel Knitting Mills, Shamokin, Pa. are perfecting plans for the installation of additional machinery at their local plant for the manufacture of hosiery. Practically all departments will be remodeled and equipped. The present machinery will be removed to a mill at Riverside, N. J., and will be used for knit goods production at this location. The company has closed its Shamokin plant until about.

(*Continued on page* 456.)

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KNITTING KINKS

PRACTICAL DISCUSSIONS BY COTTON'S READERS ON VARIOUS KNITTING SUBJECTS

We invite our readers to make use of this department for the discussion of any and all problems arising in connection with the knitting mill from the office to the packing and shipping departments. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. All questions will be answered as promptly as possible. The names and addresses of the contributors must be given, but will be held in confidence and a pen name substituted when printed. All accepted contributions other than questions will be paid for after publication. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so endorsed. This department is open to all.

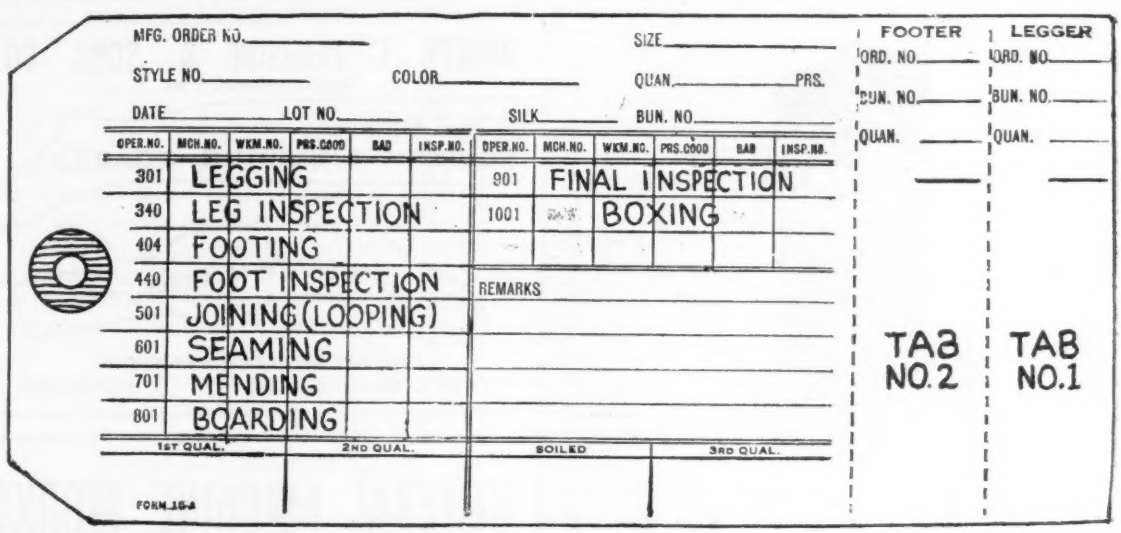
A Convenient Route Card.

EDITOR COTTON:

I was very much interested to read the new department, "Knitting Kinks," which you started in your December issue.

As my "contribution to the cause," I submit the following kink which has served our mill to very good advantage in the way of providing a record of the route through which the goods pass in going through the mill.

The accompanying form is the route card or bundle ticket. This ticket is filled in by the production department as regards style, color, order number, silk lot number, size, quantity, bundle number and legging machine number. When the order is given the legger, all bundle tickets are included. When the knitted legs are completed by the legging machine operator, he attaches the required ticket



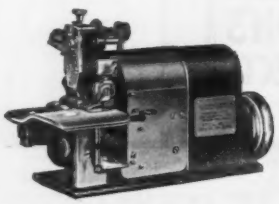
to each bundle. As a receipt, the operator is given the tab marked No. 1, dated and initialed by the clerk who receives the bundle. The legger is required to enter in the space opposite the operation number 301, his clock number. The leg inspector who looks over the bundle enters her clock number and the number of pairs, good, bad, etc., in the space opposite operation 340. The footing machine operator, after completing the bundle, receives as his receipt the tab marked No. 2, dated and initialed by the receiving clerk. These two tabs are perforated so that they may be detached readily.

Every operator, joiner, seamer, mender, etc., is required to enter his clock number and the number of pairs in the bundle at the completion of his operation. After the hosiery has been finished and put into the finished stock, the bundle ticket, with the final record of firsts, seconds, soiled and thirds (shown at the bottom of the card) is sent to the production department as notification of a finished bundle, and as a record of the number of firsts, seconds, etc., made.

In my opinion, the greatest advantages to this form of route card are the tear-off tabs given the knitter, a receipt to prevent pay disputes, and the entering of each operator's clock number and the number of pairs at that operation makes easy the checking of bad work or shortages.

J. D. R. (Mass.)

MERROWING



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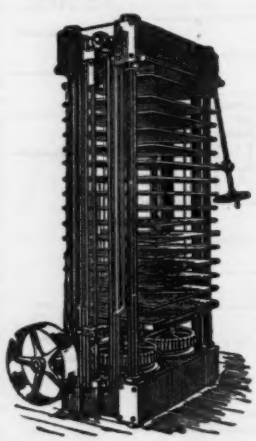

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MANUFACTURERS OF
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HOSIERY FINISHING BOARDS
THAT WORK ABSOLUTELY SMOOTH
PROMPT SERVICE—RIGHT PRICES
1815 E. Boston Avenue, Philadelphia

GENERAL MACHINE WORKS
YORK, PA.
Manufacturers of
Circular Rib Knitting Machinery
Cylinders and Dials

Increasing High Quality Production.

EDITOR COTTON:

"Am I getting the greatest possible production from my plant?"

"If not running full, am I getting the greatest possible production from the number of machines that are in operation?"

Unless a knitting mill manager asks himself these questions, he may operate more machines, and employ more labor, than is really necessary in order to secure a daily production of a given quantity of goods.

New ways are constantly being introduced into the various mills throughout the country for the purpose of checking and recording the many and varied causes of imperfect work. We are always being shown things, and reading suggestions, for the elimination of difficulties caused by improperly operating machines, and most of us spend quite a good deal of time and effort in this direction.

But I wonder how many of us are watching the machines which give us the least trouble, the ones which rarely call for repairs or special attention so as to find out whether we can improve our effieiency in this direction.

In an experience of twenty-six years in the game, I have found it best to have a report prepared daily by some person in each department, indicating or showing the total amount of goods produced on each machine. After this figure, the amount of imperfect work is shown, both items being on the same line, opposite the number of each machine.

Thus, at a glance, I can see whether or not the machines which are in the best working order are running steadily. It has been a great advantage to me, and I pass the suggestion along to the readers of "Knitting Kinks" for whatever it may be worth to them.

Herein lies the success of the knitting mills, for the goods taken from the machines which produce the least amount of imperfect work, are produced more profitably than the good dozens taken from a machine which has also turned out a certain amount of imperfect work.

An increase in the production of the machines which the report shows are in the best working order, by running these machines steadier or in some way giving them better attention, means more good work coming through the mill.

And, after all, isn't that what we are all trying to get?

G. W. B. (Ohio)

Overcoming Defective Gores.

EDITOR COTTON:

We have a machine that is making menders in the gores of the heel and toe, and would like to know how to overcome this. Can you make any suggestions?

R. V. T. (N. Y.)

EDITOR COTTON:

Replying to "R. V. T.," in regard to his machine making menders in the gores of the heel and toe, would suggest that he examine the sinkers and see if the lead is right; that is, three sinkers should be in when the hook of the first needle coming up on the end cam is on a level with the top of the sinker. Some machines will work with four sinkers in. Also, he should see that the take-up spring is not too strong, then another remedy that has proven very good is to take out the needles where the mender is being made, and take the number out of the center of the short butts and put these in the side and the others in the center. Also see that the sinkers are not bent on the nose and that they work free in the grooves; that the sinker cams are free from nicks or rough places. The stitch should not be too tight nor too loose, and the needles should have the proper friction, with no bent latches or rough rivets.

Old Knitter (Pa.)

Wants Hosiery Machine That Will Close the Toe.

EDITOR COTTON:

Is there a knitting machine made that is full automatic and will transfer from the rib top to the plain knit, and that will also close the toe before the hose or half hose comes off the machine? I know of a machine on the market which automatically transfers, but it does not close the toe and this must be done later on a looper or else sewn.

Automatic (Ky.)

Desires Method for Making Fancy Tops on Stockings.

EDITOR COTTON:

I would like to have some contributor to your department of "Knitting Kinks" explain the method used in producing the fancy tops on golf stockings. What kind of an attachment is used for this work and how does it function? About how much would be the additional cost per dozen pairs to put on these fancy tops?

Any information on this question will be appreciated.

H. C. (Tenn.)

Who Can Explain These Troubles?

EDITOR COTTON:

Here are some difficulties that sometimes arise on our spring needle loop-wheel knitting machines. I wish the readers of your "Knitting Kinks" section would tell me what causes these troubles and how they may best be remedied.

Sometimes a machine will make tucks in a vertical line and again tucks will be made at random.

What makes drop stitches occur? Usually these will come singly but occasionally there will be a series of them without any break in the yarn.

What are the most common causes of tight stitches on this type of machine? These usually come in rows or sequences.

What causes the beards of the needles to break as they sometimes do?

Then, sometimes, needles break off at the lead and while we have found troubles that we thought were the causes, it seemed to us probable that there might be specific reasons we have overlooked. H. C. K. (Pa.)

Remember the Knitting Arts Exhibition at Philadelphia during the week of April 7-12 inclusive.

The Yarn Market

The advent of the new year brought little if any change in the condition of the Philadelphia cotton yarn market—except possibly some little additional hope.

Just prior to the holidays many dealers anticipated a period of general inactivity among yarn consumers brought on by the festival period, and ceased active efforts on their own part, with road salesmen also coming home, for a brief vacation.

Yarns drifted toward the close of 1923 in about the same condition as was reported here last month; there was little change in the situation as regarded demand and consumption. Prices had slumped somewhat and during the holidays some dealers added to the quotations a little bit; in the thought, it was explained, that a small change in quotations then would have little effect upon the prospects, and it was desired, if possible, to begin the new year right by going into it on a higher price scale.

Subsequent events during January, however, pared prices down to a level a few cents under those which greeted the new year. 20s single skeins, for example, which were quoted here last month at 54½ cents for December 16th, had dropped noticeably during and after the holidays down to 52 cents on the list printed this month for January 19th. 30s single warps lost a couple of cents from 61 to 59 cents over the same period. A loss of three cents for 30s two-ply warps was recorded, and frame spun carded yarn for hosiery use fell off about in the same proportion for the two dates named.

The citation of these few illustrations is by no means intended to convey the thought that the period between these two dates was by any means unusual, or that the price decline within this period was especially significant. As a matter of fact, the rates fluctuated quite a bit from various influences over this month, and in some cases the fluctuations were specific and in others general. The comparison is intended only to show the trend.

Reference was made here last month to the effect displayed on the yarn market by the depression in distribution circles of finished goods. This influence continued to exert itself throughout January, and was possibly the most important contributing cause of an extended condition of dullness in this market from the standpoint of business done. Conditions in retail and jobbing circles have been far from encouraging to the manufacturers, with the result that there are large stocks of accumulated merchandise—either in the warehouses of the mills, or somewhere further along the line in the hands of jobbers or other distributors. There is nothing in a stocked-up warehouse with no immediate prospect of goods moving to induce an interest on the part of yarn consumers in yarns—at any price, almost. It is much safer to wait out the next man than to draw any further cards.

Thus is offered the explanation for a lack of interest in the yarn market on the part of these weavers and knitters. It was felt that their absence from market was not so much a resistance against price, but rather a policy of waiting for something to move on before replacing it. A seeming indication of this is the fact that counter offers coming from prospects are so absurdly low as to show that this response is more expressive of the feeling explained than in real earnest.

Business throughout the first month of the year exhibited itself practically entirely in hand-to-mouth lots, with an expressed intention on the part of the dealers to go after future business thus far not developed and let the immediate buying come in of its own accord.

Quotations for the Philadelphia market on January 19th follows:

Single Skeins.

4s to 8s	47	10s	48
12s	48½	14s	49½
16s	50½	20s	52
24s	54	26s	56½
30s	57½		

Single Warps.

8s	48	10s	48½
12s	49	14s	50
16s	51½	20s	52½
26s	57	30s	59
40s	68		

Carpet and Upholstery Yarn in Skeins.

8s and 9s 3-4 slack	48
8 3-4 tinged tubes	43½
8 3-4 hard white warp-twist	45
8 3-4 hard twist waste	43

Two-Ply Skeins.

8s	47	10s	48
12s	49	14s	50
16s	51	20s	53
24s	55	26s	56½
30s	58½	40s	68

Two-Ply Warps.

8s	49	10s	50
12s	51	14s	52
16s	52½	20s	53½
24s	56	26s	58
30s	60	40s	70

Frame Spun Carded Yarn on Cones.

8s	47	10s	48
12s	48½	14s	49
16s	49½	18s	50½
20s	51½	22s	52
24s	54	26s	55½
30s	59	40s	69
30s double carded	60	30s tying-in	57

Two-Ply Combed Peeler Skeins and Warps.

8s to 16s	68 @70	20s	70 @72
24s	73	30s	75
40s	80	50s	87
60s	95 @98	70s	1.05 @1.10
80s	1.20		

Mule Spun Carded Yarn on Cones.

10s	52	12s	52½
14s	53	16s	53½
18s	54	20s	55
24s	57	26s	59
30s	63	40s	73

Mule Spun Combed Peeler Yarn on Cones.

10s	58	12s	59
14s	60	16s	62
18s	63	20s	64
22s	65	26s	70
28s	71	30s	73
36s	75	38s	80
40s	82		

For the manufacture of textile chemicals, and the rendering of a service in connection with these products, the Seydel-Thomas Co., 35 Glenn St., Atlanta, Ga., has recently been organized. Paul Seydel, the president of the company, is in personal charge of the making of the products, which are designated by the trade name "Seyco." Sam C. Thomas and C. C. Clark, who have for many years been calling upon the southern mills, and who are widely and well known throughout the southern territory, will represent the new company in sales and service. Mr. Thomas is vice-president of the organization. V. Woolley is secretary and treasurer. Prompt and modern service in warp dressing and finishing will be one of the chief features of the new organization. A branch office is maintained at 206 Andrews-Law Building, Spartanburg, S. C.

National Association of Hosiery & Underwear Manufacturers meeting, Bellevue-Stratford Hotel, Philadelphia, April 8 and 9.

LEESONA
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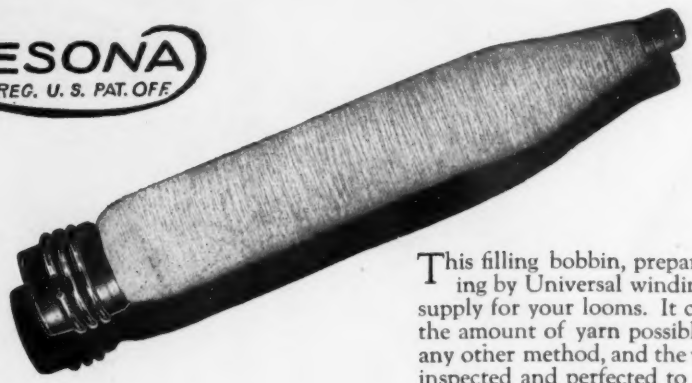

This filling bobbin, prepared for weaving by Universal winding is the ideal supply for your looms. It contains twice the amount of yarn possible to wind by any other method, and the yarn has been inspected and perfected to reduce weave room waste. This is but one of the economies of Universal Rewound Filling.

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THE advantages of Universal Rewound Filling are worthy of your immediate consideration.

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—Increased loom efficiency reducing cost of weaving per cut.

—A tremendous reduction of waste.

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We will gladly submit to you the proof of the efficiency of Universal Rewound Filling—proof of its effectiveness and economy in actual mill operation.

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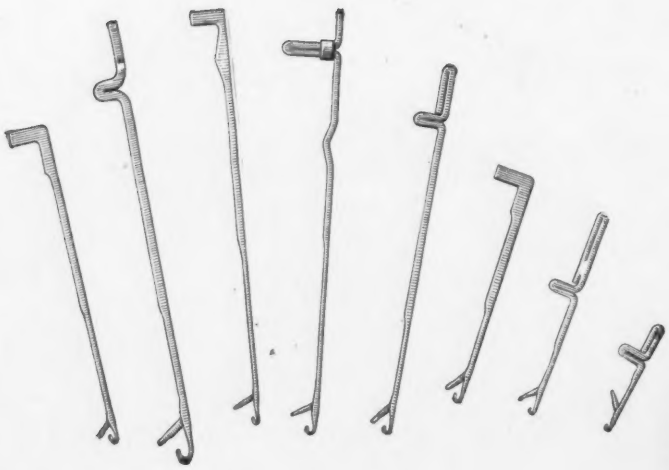

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It is good business to remove all handicaps from your machines.

"Excelsior-Torrington" Needles play fair with your machines and with you. Present excellence, however, does not satisfy us. To still further lower needle costs by improving Torrington Needles is the goal of this organization.

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The Knit Goods Market

It always is a matter of satisfaction to be able to find some one on whom to lay the blame for what goes wrong with us. In the knit goods primary market there is, and for some months has been, a continual shifting of the responsibility for the absence of snappy business at a time when the economists, statisticians, forecasters and trade news writers are telling us fundamental conditions are sound and that we are at the dawn of a brisk and prosperous six months. In other words, all interests are passing the buck.

The truth may hurt, but it also is painful to wake up some morning and find we were fooling ourselves while trying to fool the other fellow. It might as well be admitted that trading in knit goods was not satisfactory to manufacturers during the late months of 1923 and did not start off as was expected in 1924. Sellers say this condition was due to excess caution on the part of buyers. Manufacturers charge jobbers with destructive conservatism. Jobbers complain that retailers have their face to the wall, and cannot, therefore, see ahead, and refuse to back. Retailers assert the consuming public will not pay the higher prices that are threatened. Yet we are told by the Federal Reserve Board that last year this country produced more, spent more and saved more than in past years. When we have exhausted the chain of human agencies which might be the cause of the backward business in hosiery, underwear and sweaters we lay the situation to a lingering autumn and the fact this is presidential election year and fraught with danger.

In the final analysis it probably can be shown that weather and prices have been the main factors in the unsatisfactory situation. Weather last year, at periods, had much to do with holding down the yield of cotton, and the short yield explains the position of cotton. But silk hosiery has been and still is no less draggy than cotton goods. The high price of cotton is not an explanation of jobbers' refusal to operate on a normal basis in silk hosiery, which, considering cost of raw material, might be regarded the best buy in hosiery lines. Some folk among distributors will not subscribe to this view declaring there has been excess production and that the market is flooded with so much distress stock that values of fresh goods are kept disturbed. Some recent sales by department stores and prices which have come out from a few mills and commission houses support the contention the trade would be better off if there were less silk hosiery immediately available and less potential production.

A few mills specializing in ladies' silk stockings have booked volume business for the first half of this year; most of the mills are in need of business. Some of the latter undoubtedly will name new low prices, on the theory low prices make for bigger sales, and it should not be surprising to find that, in a market well supplied, output has been increased for finding a lower overhead and bringing manufacturing cost to a minimum.

It is stated by a commission man that a manufacturer has planned to place on the market a ladies' 10-thread silk boot stocking to be sold to jobbers at $11 a dozen, which is $2.85 below the Berkshire Knitting Mills' price for an 11-thread, and three dollars under the price at which the Oakbrook mill sold up to July of its 12-thread. A selling agent assured the manufacturer the stocking would have a good sale at the price mentioned, and it doubtless would, but it is equally probable that some other mill in need of business would match it and perhaps go one better.

Last month a wholesaler was offering the remnant of a sizeable lot of ingrain all-over silk stocking, apparently 8-thread, at $10 a dozen. Militating against the stocking was the fact it comprised no colors, the entire lot being white. Again, ingrain goods have not been in demand lately, and one leading manufacturer of high class all-over silks, with lace clocking, has discontinued the number. Such a stocking is priced at one large mill at $22.50 a dozen and is finding few buyers.

It is a question whether a mill offering fresh silk hosiery at a price which barely lets it out whole is not in a safer position than the one with old stock, particularly of ingrain or white, for there is being heard complaint of considerable of the hosiery sold prior to the holidays by several of the large stores, at prices about equivalent to what manufacturers get from jobbers, has come back to the stores from persons who showed it lacked wearing quality, presumably having deteriorated by being held in improper packing or in warerooms not suited to the safe storing of silk that has gone through the several manufacturing processes. A department manager denied that stockings returned had been a long time in the store, and added that the fault lay with others. Thus there was the passing of the responsibility to either jobber or mill. Some jobbers who have had experience with distress goods say they would prefer to pay a dollar a dozen more for what was known to come from fresh stock.

Another matter that will have to be reckoned with and may necessitate a change in the plans of some manufacturers is that of redyeing of both silk and fiber hosiery. Because of swift and unexpected color style changes dealers have been unwilling to buy for stock of any but the established shades whose continued popularity seemed to admit of no question, depending on mills to supply on short notice any shade they might call for. This led to mills carrying stocks of white and certain of the pastel shades which could be redyed, and it has not been infrequent that a lot of stockings ordered one day was dyed the next and within a few days put in transit. Now, it is reported from Toledo, O., a woman's organization has been led to believe that redyeing affects the wearing quality of the stocking, and it is stated an investigation is to be made for ascertaining whether this be the case. Women are prompted by style to buy, and frequent style changes is a foremost deterrent to normal operating in silk hosiery.

Just now it is a question whether black or colors will prevail during the coming season, for which jobbers would like to prepare, for there is strong belief in increasing use of silk hosiery by women, and the outlook is for volume business in full fashioned lines. Since it seems possible for some manufacturers to get the cost of a full fashioned down to near that of the circular knitted—the spring needle in particular—it would appear that the circular knit is destined to suffer a setback. Of course there will be no falling off in demand for a good stocking to retail at a

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Operatives prefer Granite State Latch Needles simply because they are ALWAYS DEPENDABLE — as dependable as the State they were named after.

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For 1924

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Under the auspices of the National Association of Hosiery and Underwear Manufacturers

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Address all communications to the Executive Offices of the Exhibition

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Under the Personal Direction of
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dollar a pair, and that will have to be made on the circular machine.

Will chiffons be as popular this year as last? This is a question that is causing some anxiety in certain quarters. Manufacturers are not in accord on the question, but from the fact the chiffons are being bought by distributors in sections where last year there was no market for them it seems the gauzy are good for at least another season. The South recently increased its chiffon orders, and there is call for them from the smaller cities in which hitherto they were practically unknown. At any rate, a number of mills have prepared for a chiffon season, and interviews with women met in a casual way were productive of but one opinion—that the gauzy is the ideal stocking.

At this writing it would seem that additions to the silk hosiery industry intended to be made this year might well be deferred by persons not financially strong and not well known in the trade. But there will be expansion. A North Carolina manufacturer some time ago put a full fashioned mercerized stocking on the market, and a commission house through which it is sold has letters from several jobbers pronouncing it the best all-round full fashioned mercerized they ever handled. This manufacturer had planned to make even a better full fashioned silk, comparatively, than the mercerized. If he does, it will sell. But it is going to be hard sledding for the mill that undertakes to market a cheapened silk stocking.

Cotton hosiery, which obviously is made in only staple lines, would appear to have a better market ahead than that of the present, but stubborn resistance to higher prices will call for adroit merchandising by mills. Thus far dealers are selling from stocks acquired at comparatively low prices; the consumer is yet to be heard from. There have been advances, of course, but they have not reached the buying public and have not been paid by jobbers in a general way. The charge that jobbers are responsible for the lagging market is true at least in part, for some of them are skeptical of goods owned at recent prices and intimate a desire to return them. One jobber with misses' coarse gauge ribs on order at $1.05 a dozen notified a mill he could not take them in, stating he had no room for storing them. He would have spoken truthfully had he said, "I am afraid." At the time he could not find storage for a half dozen cases, the established market price of the stocking was $1.15, rise 7½ cents, fall five. It must be apparent that if the average manufacturer were possessed of as little spine as this jobber mill stocks of low price yarn would have been absorbed before distributors had contracted for one-fourth of their requirements for the next sixty days. Manufacturers have been able to name low prices simply because they had the courage to buy yarns when distributors were not buying goods.

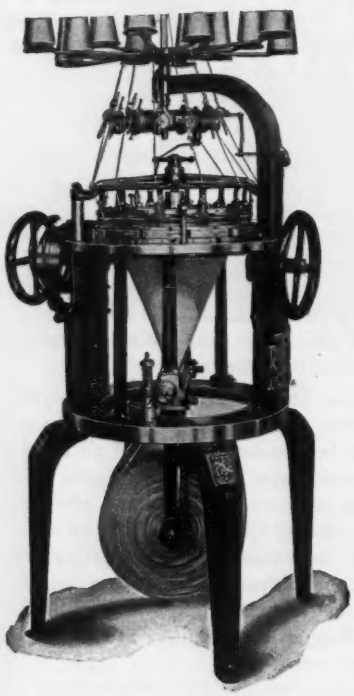
Jobbers manifesting little or no interest in cotton hosiery say they are covered to the first of March. This is known to be true of many, but a great deal of spring hosiery remains to be bought, and if mills operate for profit instead of mere overhead, it will be bought at higher than present prices. Misses' combed and mercerized ribs, it develops, ought to have been bought for the entire season when the combed was selling at $1.75 a dozen for 300 needle goods. Present value is a full dime more on the increased yarn cost alone. Some mills sold heavily at $1.75, and quotations a nickel less were heard at the end of last year. Plain mercerized was not so well sold for future, but was kept in constant moving out on small day-to-day orders sufficient to keep some mills well engaged.

It is the staples in carded, combed and mercerized that are in the weaker position for meeting price resistance from jobbers. Novelties and featured goods can be sold at approximate value easier than can branded lines of staples, except by mills selling the retail trade direct. Ladies' ribbed top high class mercerized, for illustration, with comparatively few mills making such lines answering this description, have been free sellers, at about what they are worth. Ladies' Richelieu ribs and 3 and 2 ribbed to toe mercerized also have a fairly good market, manufacturers complaining, however, that it is difficult to get adequate prices. More particularly in the spotlight for strength and activity are misses' sport ribs and infants' socks. Both have been sold well ahead and jobbers are sending repeat orders. Some few mills, however, are in need of orders for the socks. It is the well established lines that have had the big movement, and some of the more distinctive types have been sold up for almost the entire season.

Of distinctive lines of hosiery there apparently is no excess production, and of cotton staples, stocks may be assumed to have been materially reduced all along the line. There was considerable curtailment during the holiday period, it being estimated that, taken as a whole, mills making low end goods lost the equivalent of two weeks output. But as most of these mills had been operating part time or only a part of the equipment it is apparent any deficit that might exist could be turned into a surplus in short order with the speeding up of machinery at the first intimation of a revival of activity.

It is one of the misfortunes of the business of making hosiery that production seldom is kept approximately balanced with distribution, and that almost every buying wave invites expansion, with the result, generally, that by the time added equipment is set in motion the boom is over, and then more surplus production. Thus output and prices are kept seesawing, with an occasional spurt to relieve anxiety and the monotony of a drooping market.

Judging from the attitude of some of the larger manufacturers and the expressed intentions of some of them, mills operating in a small way in staple hosiery will this year meet the keenest competition in their experience. The big establishments may be expected to go after business in a big way, naming the lowest prices possible with production cost brought down to the very bottom. These, speaking generally, are equipped for financing extensive yarn purchases and carrying stock for accommodating that element in the trade which has, in effect, resolved that it will not buy for futures. Banks will loan a smaller per cent of the market value of yarns and finished goods made from high price cotton than if the fiber were more nearly halfway between prewar and peace periods. There will be business aplenty, but the financially weak and the not well equipped mill will not be in position to compete successfully for it. The strong will sell more dozens, at a less margin of profit per dozen, and as there seems little danger from retailers overbuying, while it is a foregone conclusion jobbers will operate conservatively, there should be little difficulty with accounts, except in instances where the desire to speculate sinks business judgment. Collections from retailers have been satisfactory, according to jobbers.



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BRINTON BODY MACHINES

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Built in all sizes up to 24 inches. In all cuts up to 14 needles per inch.

You owe it to yourself to investigate this machine.

We also build all styles of Hosiery Ribbers and Knitters and various other circular machines for all kinds of knitted articles.

Samples, prices and particulars on request.

H. BRINTON COMPANY
Philadelphia Pennsylvania

Disturbing to some interests is the fact retailers, because of weather conditions, are oversupplied with hosiery of wool and in mixture, and that therefore they may be disposed to proceed very slowly in the matter of making commitments for Spring and Summer. The effect of this, though, has been discounted by the larger mills, which, if they have not already done so, will adapt themselves to selling wholesale on a retail basis. Once the periodical wants of their customers can be gauged they may manage to carry a well balanced stock without maintaining stocks so large as some manufacturers have been carrying.

One leading mill, whose branded lines are sold in every large city and in the smaller cities of every state, started the year with more than 50 per cent less stock than it carried constantly last year. The management anticipates dealers will buy only as wanted, but will insist that they give the mill at least two to four weeks time in which to complete orders. As the mill sells to only certain stores in any city, it is purposed to discontinue selling those which do not conform to the new policy which was inaugurated at the beginning of the year. This can be done in well grounded branded goods, which virtually sell themselves, but in relation to staples, unidentified as to origin, and distributed through jobbers, dealers will be in a strategic position.

Ladies' hosiery of wool in mixture proved quite disappointing to manufacturer and dealer. Immediately following the pre-Christmas shopping, it was observed, some of the department stores were putting such goods across the counter at prices which spelled loss for some one. A line of wool and artificial silk in combination was featured, in one instance, at a price less than jobbers had paid manufacturers.

While several mill lines of wool hosiery are being offered for next winter, it is understood jobbers are not showing interest. It is thought that later they will buy ladies' light worsted, and heathers to retail at 50 cents and one dollar, but that the bulky stocking has had its best season.

Men's fancy wool socks have sold well in the retail stores and wool in mixture also proved a good asset for dealers, who are reported pretty well cleaned out of the better types of this class of goods. Supposedly good for next winter are cotton heathers, to retail at a quarter, and cotton-and-wool as a 50 cent seller. But it is a safe guess that, with distributors haggling over prices of hosiery for the spring and summer months they will not operate extensively for some time for the winter of 1924-5—not, at any rate, while uncertainty as to near-future wool values exists.

Wool underwear came out for next winter at only moderate advances, and it appears not much business was placed. In fact, except as to those lines of a half dozen or more mills which opened late in November and in early December, cotton ribbed goods were bought very sparingly. Buyers for leading jobbing houses showed themselves in the primary market in the first two weeks of January, but appeared not ready to operate. They came, primarily, for the annual meeting of the National Wholesale Dry Goods Association, about the middle of the month, arriving before many of the northern mills had named prices. There could be discerned a disposition on the part of buyers to cooperate with mills in arriving at prices at which it might be safe to contract, but all hands preferred to defer their initial buying until after the market situation had been canvassed in the meeting of the Jobbers' Association of Knit Goods Buyers.

Jobber interest in winter underwear was apparent. It was felt much of the buying would be done late and that deliveries during the earlier periods might be unsatisfactory. So, while prices were the obstacle, there was a desire to "get in," for averting pressure on mills in the event they did not operate until orders were booked in quantity to warrant. Buying too long deferred, it was admitted, doubtless would result in the temporary laying off of mill help, causing further uneasiness and diminishing purchasing power. Buyers wanted to contract, as a matter of security, but on the other hand they did not want to do so, because of fear.

While a number of the northern mills had not openly named prices, also awaiting the deliberations of buyers at their meetings, some had opened unofficially and gathered in a few orders at the higher prices. It was believed the test of strength as between mill and jobber would not be witnessed until well in February, depending on fluctuations in cotton, developments in world markets and the prospect of the proposed income tax reduction and the fate of the soldier bonus bill. It cannot be denied that the tax question is playing a big part in market hesitancy. Final disposition of the two bills before Congress either will give an impetus to business in textiles, along with other manufactured commodities or keep the wheels of industry clogged.

Regardless of what legislation on the matters paramount in business shall be enacted, it is the belief of some important jobbers that they will require, say, ten per cent less heavy weight underwear if present mill prices be maintained. A leading factor discussing such a prospect points out that if the cotton crop figures be correct the country will have to get along with ten per cent less cotton goods as a whole, and that consumption of goods in the production of which poundage of yarn is the big item will suffer the more pronounced declines.

In favor of manufacturers is the fact jobbers have little winter underwear for seeing them through the season; that retailer stocks are light, and that with seasonal weather for the remaining winter months every available case will have been disposed of. Mills have none, some having completed their deliveries by a very close margin.

By the end of winter there will be no stale stocks of heavy weight underwear; nor will fresh goods be bought for as little as they sold for at the tail end of the season. So that at the moment it appears that next winter the 16-pound suit will be offered at the counter at an advance of about 50 cents per garment over current retail prices. The milder the present winter the more severe will it be for the underwear jobber lacking courage to take an even chance with the underwear manufacturer and contract for a goodly part of his requirements.

The effect of the January drop in temperature was seen at once in the business of jobbers selling underwear. Small retailers were prompt to place orders for a few weeks' requirements, and in some respects the underwear departments of jobbing houses presented scenes not unlike those in retail stores when bargain sales are under way.

While still selling underwear for the current season, jobbers said they would be in no hurry to buy for next winter. Several leading buyers thought their initial orders would be

for about ten per cent of the usual first purchases, and that the bulk of their business would be placed so late that it looked as though mills would be in distress from lack of business in the early months and under severe pressure for deliveries in the late months. "I feel quite certain," one important buyer said, "there will be witnessed very sharp curtailment of consumption."

It is noted that road salesmen from a number of mills which have made no announcement of having opened their lines have been calling on the trade. It stated that instead of the 20 per cent advance predicted some weeks ago by Rodney Wilcox Jones of the Augusta Knitting Corporation the increase is nearer 15 per cent.

A few repeat orders for men's light weight underwear for the coming season have been placed, at substantial advances over last year's opening. In view of the materially higher prices, it is felt jobbers will do very little buying until after they have sold what they have. The increase in the price to the consuming public, it is pointed out, will go into effect about the middle of the season, and from this it is deduced retailers will want to make a cleanup of their low price goods before replenishing at the higher cost. Announcement that a number of New England cotton mills will operate indefinitely on a three-day-a-week schedule, coupled with the prediction curtailment will be continued for perhaps six months, has had a disquieting influence among distributors and, in turn, is disturbing to manufacturers.

In one line of cotton textiles, in which Philadelphia is conspicuous, manufacturers say they are getting practically no Spring business. It is the intention in this branch, according to several representative mill executives, to continue operating a few weeks in the hope jobbers will place orders, and then, if business be not forthcoming, close the factories pending a revival.

Business in sweaters underwent a setback after fairly spirited buying for next Winter. Distribution was impeded by mild weather, and not a few retailers returned to jobbers in December, sweaters which had been bought four to five months before, others canceling repeat orders. Returns and cancellations generally were accomplished by an explanation to the effect, "this is not sweater weather." In the circumstances, retailers are in no mood for giving encouragement to jobbers, and the latter, most of whom completed their initial purchases, may be said to be out of the market. Not until the fate of stocks in retailer hands shall be made known will there be much activity in the sweater primary market, it is predicted among first hands.

The temporary lull in sweaters, and the fact there has been some disappointment as to bathing suits, is reflected in a stagnant market for worsted yarns for knitting purposes. Yarn prices, however, are holding firm on the strength of the foreign wool market. Most spinners have materially curtailed production and still are able to put some yarn in stock.

A new booklet covering the entire "Tag" line of automatic temperature controllers, recording thermometers, etc., briefly describing each type of instrument, has been issued by the C. J. Tagliabue Mfg. Co., 18 Thirty-Third St., Brooklyn, N. Y., and copies may be had upon request. The booklet is known as Catalog 904.

Among the Knitting Mills.

(*Continued from page* 443.)

March in order to carry through the project.

The Glorie Underwear Mill, Inc., Reading, Pa., recently organized with a capital of $300,000, has acquired the plant and business of the local company of the same name. Plans are under way for extensions in the business, to include expansion in the mill on Maple Street. Harold M. Levan, heretofore manager of the company, has been elected treasurer of the new organization.

The Minerva Knit Wear Co., Brooklyn, N. Y., has been organized to operate a local knitting mill and plans for extensive production. The company is headed by J. Schwartz and H. S. Landau. It is represented by Furst, Schwartz & Schwager, 215 Montague Street, Brooklyn.

Sanford Sherman, New Hartford, N. Y., has secured permission from the Federal Court to acquire the mill and property of the Olympian Knit Goods Co., on local site, for a consideration of $194,000. Plans are under way for the organization of a new company to take over and operate the mill, to include remodeling of different departments, and equipment replacements.

The Graham Knitting Mills, Inc., Brooklyn, N. Y., recently organized, has plans for the operation of a local mill for the manufacture of a general line of knit goods.

The Morris Knitting Mills, Inc., New York, has been organized under state laws, with a capital of $150,000, to take over and expand the company of the same name at 1609 DeKalb Avenue, Brooklyn, N. Y.

Now that cast iron welding has become practically an institution in and around a cotton mill, problems often arise in connection with this work that are more or less baffling because of a lack of understanding of the necessity for adequate preheating, proper welding practices, and suitable annealing, as well as other principles.

A helpful contribution that does much to provide this information is a booklet issued recently by the Linde Air Products Company, entitled "Cast Iron Welding by the Oxy-Acetylene Process." The booklet begins with a discussion of the nature and properties of gray cast iron, and continues with an explanation of the application of welding to the handling of cast iron, the equipment necessary, how to prepare for welding, the reasons for and methods of preheating and annealing and their importance, necessity and means of testing, etc. An appendix gives some practical problems in cast iron welding and their solution.

Merrow Machine Co., Hartford, Conn., have published a new English edition of their illustrated catalog, in which are incorporated the numerous modifications and refinements in various models of their machines during recent years, making the catalog considerably larger than previous editions. A new model, the 60-Q machine, which produces a very small shell stitch in combination with the overedge stitch, especially effective on infants' undergarments, is described and illustrated. Another feature of interest is the shipping information supplied for the various machines, including gross and net weights, dimensions, cubic contents and a five letter code for use in ordering, the latter feature being of benefit to the foreign buyer ordering by cable.

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IN THE same degree that it is important and profitable to paint your mill walls, you will find it likewise advantageous and profitable to do that painting the DeVilbiss way. The DeVilbiss spray gun makes possible 4 to 5 times faster painting than the hand brush, and insures a more thorough and uniform, greater light-reflecting and longer wearing coating. The same equipment can be used in mill exterior and mill house painting.

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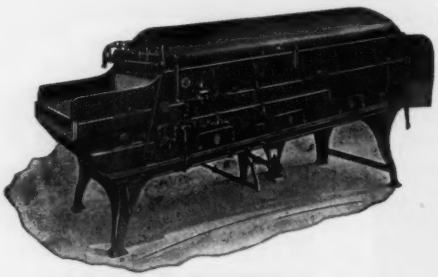

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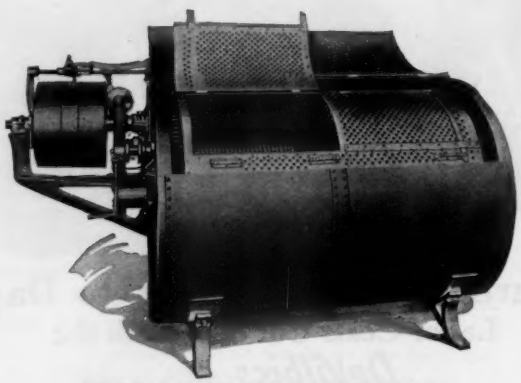

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Booklet 1119

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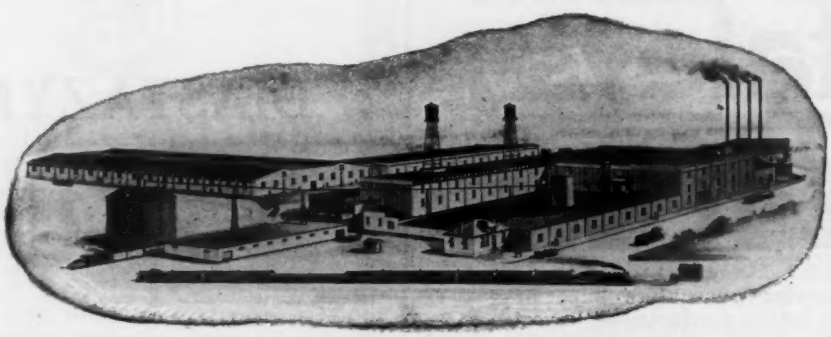

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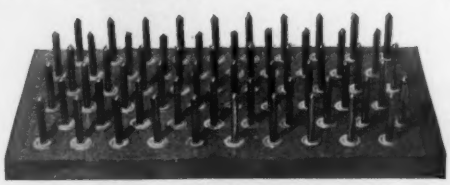

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Expert Opinion from men in charge of the weave rooms in prominent mills is available to superintendents and overseers upon request.

Send for this information so you may know the merits of Washburn Kore-Lokt Pin Boards as an improvement over old style Filling Boxes. Learn how the other fellow checks up results from the "Build of Bobbins."

NEW BEDFORD, MASS.

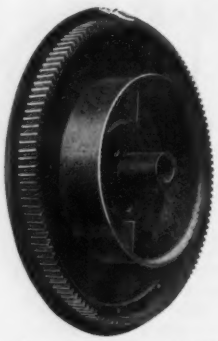
PERFECTION
SHELL ROLLS

FOR
BLEACHERIES
BALL WARPING
FINISHING PLANTS
CORD FABRIC SHIPMENTS

NEW BEDFORD, MASS.

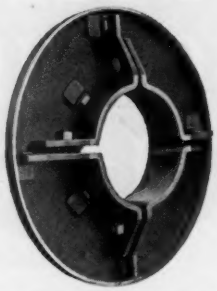
All Steel Loom and Section Beam Heads

Cannot Break
Do not Bend



"ALL STEEL" LOOM BEAM HEAD
"MALLEABLE" GEAR
PATENT PENDING

"ALL STEEL" SECTION BEAM HEAD
PATENTED



"ALL STEEL" ADJUSTABLE HEAD
SPLIT OR SOLID TYPE
PATENT PENDING

DUPLICATE YOUR CAST IRON HEAD IN STEEL—ELIMINATE ALL BREAKAGE
MAKE YOUR BEAM HEAD INVESTMENT PERMANENT

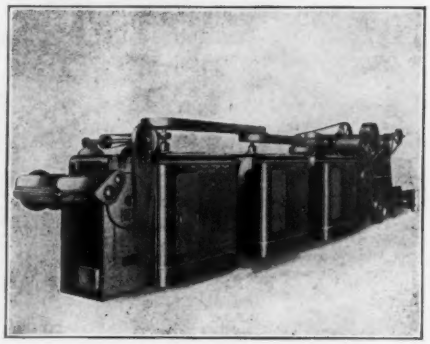
Mossberg Pressed Steel Corporation

Attleboro, Mass.

SOUTHERN OFFICE 201 AUGUSTA ST. GREENVILLE, S. C.

THE
WHITINSVILLE
SPINNING RING CO.
WHITINSVILLE, MASS.
SPINNING RING
SPECIALISTS
ESTABLISHED OVER FIFTY YEARS
DIAMOND FINISH

SACO-LOWELL
OPENING MACHINERY
INCLUDING
TRIPLE TANDEM VERTICAL OPENER COMBINATIONS



Proper opening and mixing of the cotton increases production and enhances quality. The installation of equipment as illustrated contributes largely to the securing of such results. Opening combinations furnished with single, double or triple openers.

SACO-LOWELL SHOPS

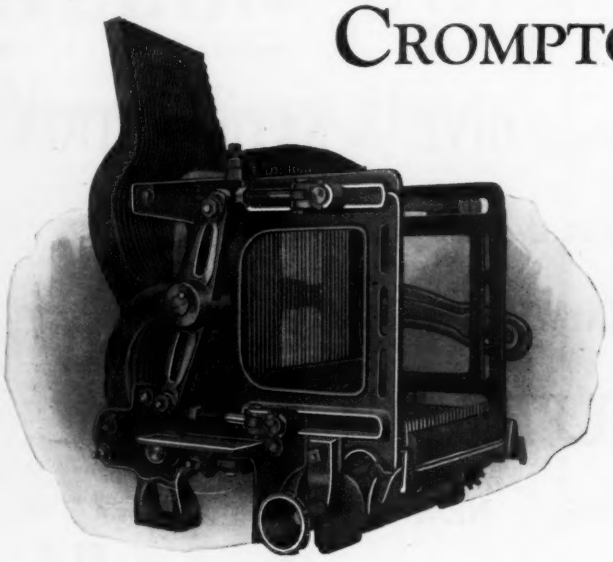
ROGERS W. DAVIS
Southern Agent
Charlotte, N. C.

Branch Southern Office
Greenville, S. C.

77 Franklin Street
BOSTON, MASS.

SHOPS:
Biddeford, Me.
Lowell, Mass.
Newton Upper Falls, Mass.
Pawtucket, R. I.
Charlotte, N. C.

CROMPTON & KNOWLES
DOBBIES



NEW FEATURES OF SPECIAL INTEREST TO WEAVERS AND FIXERS

1. We are now prepared to equip the dobby shown above with pressed steel hook levers (patented) and drop forged top and bottom hooks (patented).
2. Built with slotted fingers and locking rod (patented), making it easy to remove, clean and replace the fingers.

We call attention to the carefully machined swivels and studs used for operating the dobby knives.

This dobby can be applied readily to any make or type of loom.

CROMPTON & KNOWLES LOOM WORKS
WORCESTER, MASS.

PROVIDENCE, R.I. PHILADELPHIA, PA. PATERSON, N. J.
S. B. ALEXANDER, CHARLOTTE, N. C., Southern Manager.

WALTER L. PARKER CO.

LOWELL, MASS.

Manufacturers of Bobbins, Spools and Skewers

OUR SPOOLS:—

Are made to stand severe service and are made from thoroughly dried stock, so constructed that they are giving entire satisfaction.

OUR BOBBINS:—

Are made from the best grade of stock, and through the efficiency of our workmanship, are true running, and properly fitted on spindles.

OUR PRODUCTS:—

Bobbins—Warp and Filling. We put on all kinds of metal shields and caps.
Speeders—Plain; steel rings; metal base.
Spools—Warper; Twister.
Our Metal Bound Spools are pronounced the best on the market.
Skewers—Cop, Warper and Roving, of all descriptions.
Twisters—Universal Winder Rolls and Bobbins, Comber Rolls, etc.

We Specialize in New Mill Equipment

CHARLOTTE SUPPLY CO., SOUTHERN AGENTS.

SELECT THE HEDDLES WHICH GIVE YOU SATISFACTION

A HEDDLE FOR EVERY PURPOSE

SWISS TWIN WIRE HEDDLES

J. J. REUTLINGER

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Southern Representative:
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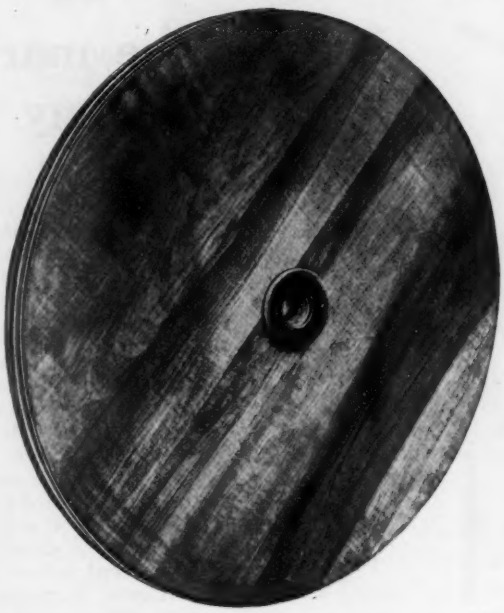
P. O. Box 1375, CHARLOTTE, N. C.

Eastern Representative:
A. J. SCHULLER,
163 MERIDIAN ST., EAST BOSTON, MASS.

The Light Weight Unbreakable Head



ALLEN CO.

PATENT

Wooden Beam Heads

Allen Company Wooden Beam Heads are practically unbreakable, insuring longer life,—they are lighter in weight which insures ease of handling and also a great saving in freight charges. Out of the thousands in use, not one complaint has been received of one broken causing loss of yarn or expense of rewinding.

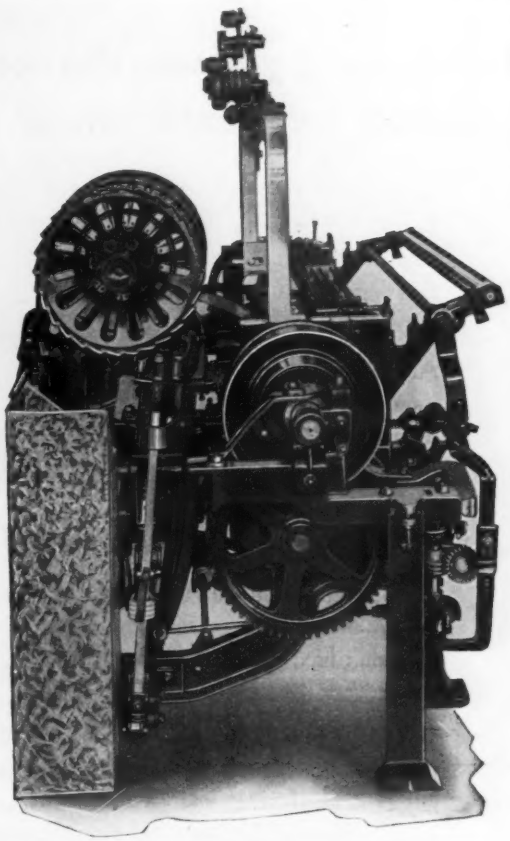
Constructed of three pieces of selected scientifically kiln dried Beech lumber, securely glued together under heavy hydraulic pressure. Accurately turned on centers. Protected on outside diameter from splintering and general wear by cold shaped upset steel tires. Finished by a water-proofing process and painted any desired color.

All Allen Company Products, tried under your own conditions, will prove profitable investments. Catalog showing the complete line gladly furnished on request. Ask for it today.

Allen Company

New Bedford, Mass.

Also Manufacturers of
Section Beams, Combination Section Beams, Beam Heads with brake drum, Top Beams, Beam Trucks, Box Trucks, Braider Reels, Lug Sticks, Mechanics Benches, Overseers Desks, Cabinets and other wooden specialties.



The Latest

NORDRAY

Automatic Loom

Multiple-harness, Feeler type

built by

HOPEDALE MANUFACTURING CO.

at MILFORD, MASS.

SOUTHERN OFFICE at
GREENVILLE, S. C.

This loom was shown at the Late Greenville Exposition and excited great interest.

It is Still the Simplest.

For those of you who did not attend the Textile Show

It was too bad that you missed the many new ideas and improvements that have been developed since the last show.

At "Shuttle Headquarters" for instance, there was an unusually interesting display of Shambow "Custom Built" Shuttles.

They created much favorable comment.

But, because you did not see them at the show is no reason why you shouldn't have an opportunity to see them.

We are prepared to send you a man who will show you shuttles and weaving devices of great interest to you. He is a Shuttle Engineer and should you require it, he is fully capable of redesigning your present shuttle or designing an entirely new model for you.

This expert service won't cost you a cent and may save you much money. Just sign and mail the coupon or write us.

Shambow Shuttle Company
Woonsocket, R. I.

JOHN C. SHAMBOW, Pres. & Treas. H. H. ULLMAN, V. Pres. & Gen. Mgr.

Philadelphia 42 421 Bulletin Bldg. Paterson, N. J. 245 Straight St. Greenville, S. C. Southern Factory

COUPON

SHAMBOW SHUTTLE CO., Woonsocket, R. I.

We will be interested to learn more about the new shuttles, tensions, threaders and other devices without obligating ourselves in any way.

Company .....

By .....

Address .....

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SHAMBOW MAKES

shuttle bills smaller
interruptions fewer
production greater
products better

MORRIS TRADE MARK PATENTED BASKET

—the mark of economy

№ 7

№ 19

Replacing short-lived baskets is expensive — and baskets that are ready for the junk pile cannot protect their loads.

Morris Duck Baskets are long-lasting baskets. Frames of Round Spring Steel are re-inforced — heavy, durable cotton duck is used for coverings. Construction is smooth to prevent injury to contents. Equipped with either steel or wooden runners.

There is a Morris Duck Basket to fill your every requirement. Equally satisfactory and saving are Morris Steaming Baskets with brass eyelets, Shipping Hampers with hinged wood covers, Factory Trucks, Laundry Baskets, etc.

An interesting booklet—and prices—on request.

MORRIS & CO., Inc.
15 Main St.,
GROVEVILLE, N. J.

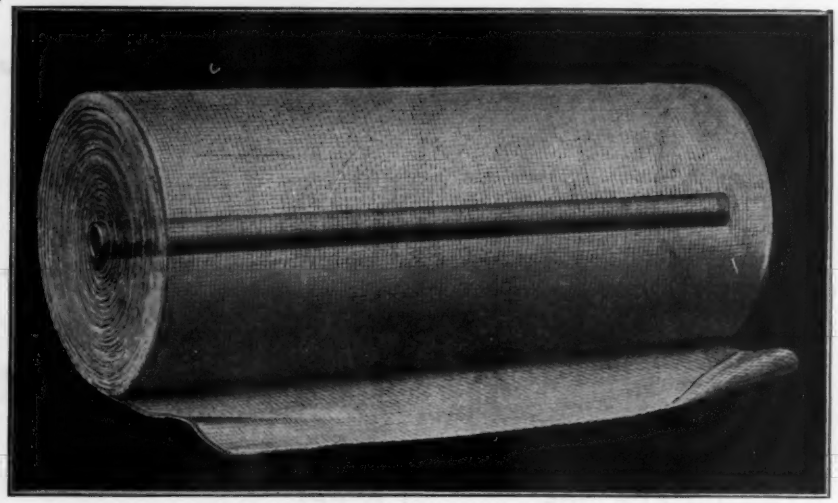
For sale by
WILSON COMPANY
Greenville, S. C.

MORRIS DUCK BASKETS

Fits the Mandrel like a glove:

Exactly Balanced:

"Sonoco Surfaced" to catch yarn at first lap:



Evenly Round:

Uniform in thickness:

Rigid:

"Sonoco Tubes assure perfectly wound packages."

"SONOCO" Cones, Cloth-Winding Cores, Tubes.

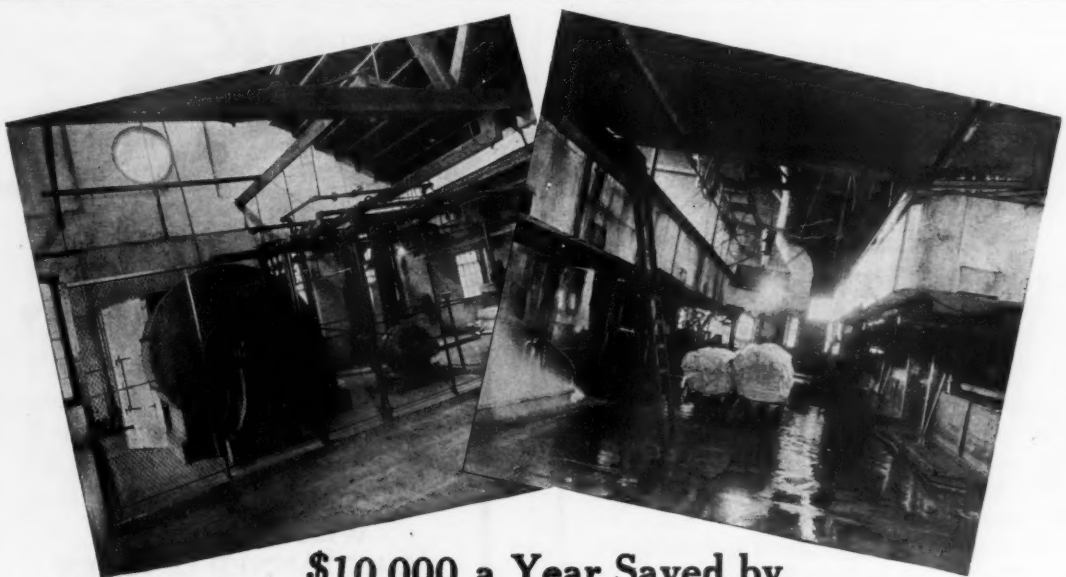
Send for Samples and Color Chart.

Special Tubes and Cores of Any Size or Thickness Made to Order

SONOCO PRODUCTS COMPANY, MANUFACTURERS

General Office and Factory, Hartsville, S. C.

Eastern Office: 410 Olymphia Building, New Bedford, Mass.



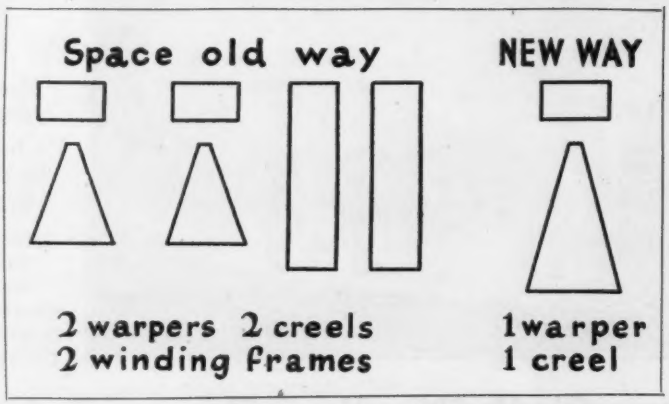
$10,000 a Year Saved by "Buffalo" Ventilation System

According to C. E. Firth, V.-P., Firth & Foster, Philadelphia, who adds, "Elimination of Steam in dye houses ends trouble with spotted goods and improves morale."

BUFFALO FORGE COMPANY 460 BROADWAY BUFFALO, N. Y.

NEW AUTOMATIC CREEL

for direct warping from FILLING WOUND BOBBINS



COMPLETELY ELIMINATES the

Spooling of the yarn

Spooling waste

Undue and irregular tension of yarn due to spooling

Stoppage for doffing

Doffing is done while warper is running.
Greater production from better warps at lower cost.
Better loomage from auto-creel warps because
Elasticity is preserved in yarn.

For Information address

AUTO CREEL CORPORATION, NEW YORK

Room 915, Fifth Ave. Building
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MORE
SOUTHERN SPINNERS
are using

AMTEX
TRADE MARK REGISTERED

SPINNING, TWISTING AND SPOOLER TAPES
Than ever before

This increasing demand indicates the superiority of AMTEX Tapes over all others.

We are pleased to build special Tapes for your particular needs.

Send us your specifications and we will guarantee satisfaction.

Manufactured by

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GERMANTOWN, PHILADELPHIA, PA.
Sold in the South by
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Wilson Company, Greenville, S. C.

AMERICAN
SUPPLY COMPANY
PROVIDENCE, R. I.

Manufacturers of

LOOM HARNESS,
WEAVING REEDS,
OAK TANNED LEATHER
BELTING, STRAPPING,
ETC.

We make a specialty of Harness for Warp Drawing Machines

PERKINS PRACTICAL BRUSH
ATLANTA BRUSH COMPANY

EVERY PERKINS PRACTICAL BRUSH IS A GUARANTEED BRUSH

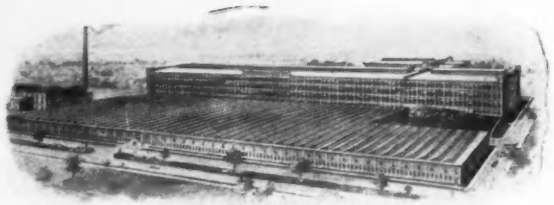
No matter whether you buy the brush from us, through your jobber, or purchasing agent, if it is a Perkins Practical Brush it is guaranteed absolutely to give you the satisfaction and service you expect of it or we will make any adjustment you desire. That guarantee isn't made because we are doubtful of Perkins Brushes giving satisfaction. Far from it. It is made because it is the only way to standardize brush buying and brush prices. Two brushes may look exactly alike and vary as widely in quality as the poles. When you buy a Perkins Practical Brush you need not even ask the materials of which it is made. You buy Dollar for Dollar value. We guarantee it, and you are the judge and jury.

ATLANTA BRUSH CO.
ATLANTA, GA.

ATLANTA BRUSH COMPANY
A Brush for every Textile Need

Electric Scrubbing!

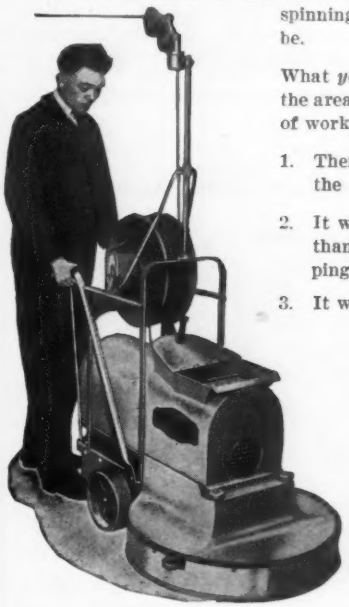
Will Save You Money



Nashawena Mills—New Bedford, Mass.

At the Nashawena Mills they *know* that the Finnell System of Electric Scrubbing scrubs floors *clean* and keeps them *clean* with least trouble and lowest cost.

More than three hundred other textile establishments use the *Finnell* System. Hand scrubbing—even if done daily—is not satisfactory. If done well it is too costly. It is really as inefficient and out of date as hand spinning and hand weaving would be.



What *you* can save depends upon the area to be kept clean, the type of work, etc. These are the facts

1. There is a Finnell Outfit of the right size for your mill;
2. It will get your floors cleaner than hand scrubbing or mopping;
3. It will save time and labor.

Free Illustrated Folder

Also booklet "Electrical Scrubbing." Write for them now. One of our Scrubbing Engineers will be glad to show an interesting film right in your office if you wish. No obligation.

AMERICAN SCRUBBING EQUIPMENT SALES CO.

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Power Scrubbing Headquarters for 17 years.
District Offices in Principal Cities.

FINNELL SYSTEM
— OF ELECTRIC SCRUBBING

"Clean Floors Reflect Clean Business"

Eclipse Slub Catcher And Tension Device

It's Automatic

Here's a perfectly designed Slub Catcher and Tension Device for Spooling and Winding Machines.

It is automatically self threading, and the Slub Catcher automatically adjusts to any size yarn, cotton, wool or silk.

Ask us for full details today.

Eclipse Textile Devices, Inc.

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Makers of

Eclipse Automatic Yarn Cleaners — Eclipse Automatic Stop Motions — Eclipse Yarn Tension Devces

Van Ness Random Dyeing Machines

Cost

may be a primary consideration

The Liberty Knotter

not only fills the requirements of low first cost but is most simple in construction and economical in upkeep and operation. Give it a trial.

Guaranteed for one year

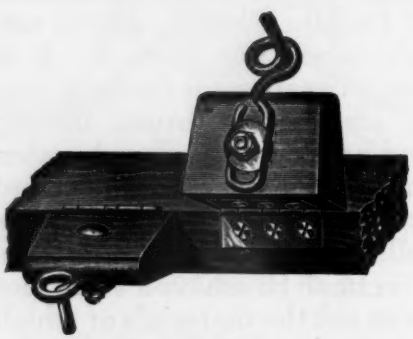
Write for information

A. B. CARTER, Sales Agent,

Gastonia, N.C.

Mill Devices Co. Durham, N. C.

The Palmer Adjustable Thread Guide



For Ring Spinning and Twisting Frames

Easily Adjusted.

Extreme accuracy and permanence of setting.

Cheapest of them all.

Mail guide-block for free sample.

Patented and manufactured by

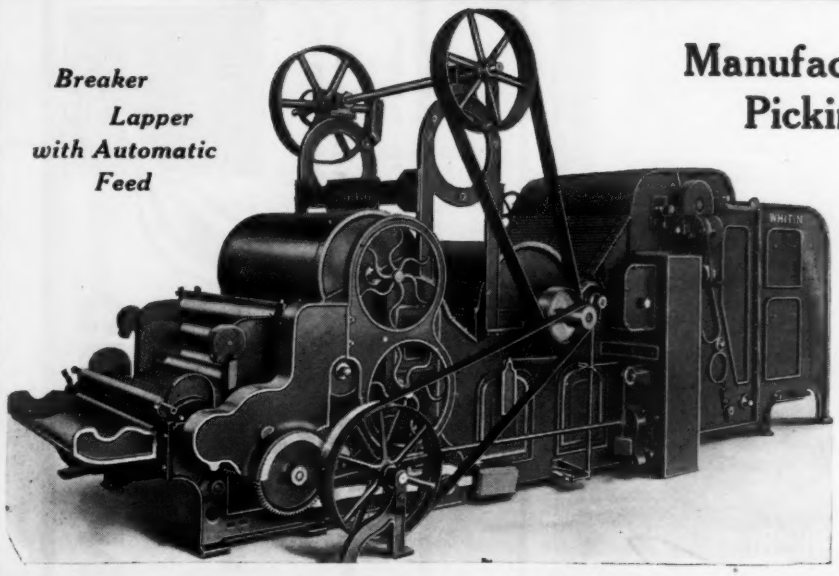
THE I. E. PALMER COMPANY

Middletown, - - - Connecticut

WHITIN MACHINE WORKS

ESTABLISHED 1831

TEXTILE MACHINERY



Breaker Lapper with Automatic Feed

Manufacturers of Picking Machines

comprising

Bale Breakers,
Cotton Cleaners,
Feeders,
Vertical Openers
Condensers,
Distributors,
Openers,
Breaker Lappers,
Finisher Lappers,
Willows,
Hard Waste Machines

MAIN OFFICE AND WORKS

WHITINSVILLE, MASS., U.S.A.

SOUTHERN OFFICE CHARLOTTE N.C.

Plain and Hand Threading Shuttles

For many years Williams has been making shuttles—shuttles for plain and automatic looms. In telling our story to the master weavers of the nation, we have laid much stress on the advantages of our sure threading automatic shuttle. We believe in it and we have not been alone in this belief. Mill Men of the country have been the judges. We, however, don't want you to lose sight of the fact that we are also large manufacturers of plain and hand threading shuttles for the weaving of cotton, wool and worsteds. Write and ask us our plan for the reduction of your shuttle inventory.

The J. H. Williams Co.

"The Shuttle People"

MILLBURY MASS.

George F. Bahan, Southern Representative, Charlotte, N. C.

Growth A Tribute To Worth

1883

THE reputation of our "Superior" quality products established forty years ago has been maintained through the years, until today our "High Grade" products are demanded and used by the leading textile mills throughout the entire country. The combined organizations at the main plant in Lawrence, Mass., together with three big stock plants in Maine, New Hampshire and Vermont, altogether operating hundreds of skilled workmen, each one of whom takes pride in upholding the reputation established forty years ago, assure textile mills of the most dependable and economical products of their kind to be obtained.

We specialize in complete new mill equipment of Bobbins, Spools, Shuttles, Skewers, etc.

Our "High Grade" Products include:—Plain and Automatic Loom Shuttles, Warp Bobbins, Filling Bobbins, Card Room Bobbins, Plain and Metal Head Warper and Twister Spools, Automatic Loom Bobbins, etc. We particularly call attention to our bobbins and spools fitted with our special metal shields of all types and kinds, also to our enamel finish in any color.

THE DAVID BROWN CO.

"High Grade" Bobbins, Spools and Shuttles

David M. Brown, President — LAWRENCE, MASS. — George Gilson Brown, Treasurer

1924

GOLD MEDAL — SILVER MEDAL

The David Brown Co.

Lawrence, Mass.

You All Know This Box

CRAYONS

Made by

LOWELL CRAYON CO.

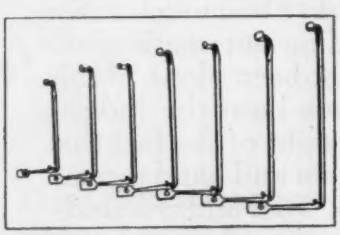
ORIGINAL MANUFACTURERS

LOWELL, MASS.

U. S. A.

More Output---Less Energy

If your machinery is not producing as it should and you find that new flyers, spindles, rollers or pressers would give a greater output with a lesser amount of energy—we are in a position, with our equipment, to provide and place those new parts.



You cannot expect real service from flyer pressers unless they are perfectly fitted and polished when installed. Ours, made of Norway Iron, are ready for service before they leave our factory.

Southern Spindle & Flyer Co., Inc.

"We Manufacture
Overhaul and Repair Cotton Mill Machinery."

Charlotte, N. C.

W. H. MONTY, Pres. and Treas.

W. H. HUTCHINS, V. Pres. and Secy.

Here It Is!

WE know it's just the thing you have been looking for, and we have put forth our every effort in the construction of SMITH'S 100% Better Baskets to make them come up to your expectations, Heretofore, when your baskets became worn and useless you were forced to discard them and buy new baskets — not so with SMITH'S 100% Baskets. When this basket is apparently ready to discard you simply slip on a new canvas cover, —the sturdy frame constructed of steel is practically indestructible and has cross slats and skids of wood.

When the basket appears to be worn, all you have to do is slip on a new canvas cover and you have a basket practically as good as new. This is the basket for you. Use SMITH'S 100% Better Baskets and cut basket expense to the bone.

It's to your advantage to investigate SMITH'S 100% Baskets.

SMITH MFG. CO., DALTON, GA.

SMITH'S TRADE 100% MARK BETTER BASKETS

SCOTT TESTERS

This cut shows one of our Combination Yarn and Fabric Testers equipped with Autographic Recorder. This attachment automatically draws a line on ruled paper giving both the strength and stretch readings. By its use, a clearer understanding of these qualities of the material is obtained as the whole test is given in one line.

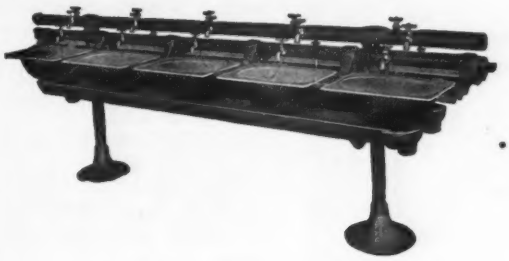
May we send you the Catalogue?

HENRY L. SCOTT & CO.

101 BLACKSTONE ST. PROVIDENCE, R. I.

Meeco Wash Bowls

Have Cut Production Costs in Every Mill Where They Have Been Installed. Let Us Send You Proof



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Drinking Fountains

METAL MEECO PRODUCTS

Shelving, Enclosures
Boxes and
Cabinets

MANUFACTURING EQUIPMENT & ENGINEERING COMPANY

FRAMINGHAM, MASS.

OIL—for Machines
WATER—for Workers

Just as your machines need oil to keep them "on the job" and running smoothly—your *workers need water* to keep them "pepped up" and producing to full capacity.

The *R-S Pure Water Fountain* provides clear, fresh, clean water at all times for workers. It stimulates, invigorates, and makes them contented.

R-S Pure Water Fountains have extra heavy vitreous china bowls and galvanized pedestals to insure long wear. Lips can't touch the nozzle—the slant stream feature prevents that.

Write today for prices, specifications, illustrated catalog, and full information.

RUNDLE-SPENCE MFG. CO.

57 FOURTH ST., MILWAUKEE, WISCONSIN

R-S "Lips can't touch the R-S nozzle" R-S

MURDOCK
WATER SERVICE

"Sandow" Fountain Self-closing

Murdock Products are the outcome of over 70 years of cumulative water service device knowledge.

No product has ever been released from the factory until we knew it to be thoroughly practical for its purpose and mechanically beyond reproach.

That is why they are giving absolute satisfaction.

INDOOR DRINKING FOUNTAINS that are real water devices made for shop service. FOOL PROOF. The patent bubbler head affords a full soft bubble and a satisfying drink. A thin squirting stream is impossible.

"Genuine" Murdock Self-closing Hydrant

YARD HYDRANTS FIRE HYDRANTS HOSE BOXES
MURDOCK OUTDOOR BUBBLE FONT FOR PLAYGROUNDS

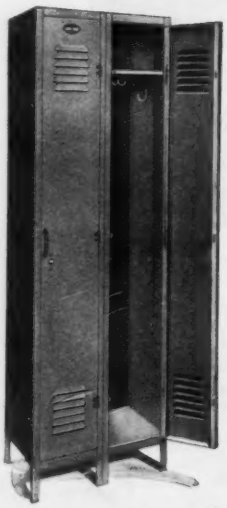
Write for fully illustrated catalogues.

The Murdock Mfg. & Supply Co.

CINCINNATI, OHIO

Makers of Anti-freezing Water Devices since 1853

DURABILT
Steel Lockers



Give you just what you would ask for if you were having Lockers built to order:

DURABILITY
SIMPLE AND CONVENIENT OPERATION
MAXIMUM SECURITY
HIGH CLASS FINISH
AMPLE VENTILATION

Endorsed by Leading Architects and installed in many of America's Finest Schools, Clubs and Factories.

Durabilt Steel Locker Co.
420 Arnold Ave. Aurora, Ill.
Sales Offices in All Principal Cities

Attractive—Sanitary—Permanent—Economical

MILLS METAL

The Best

TOILET PARTITIONS
SHOWER STALLS
DRESSING ROOMS
SHELVING
TABLES
DOORS
BINS

"Slant Lip Diamond Rail Top and Bottom"

THE MILLS COMPANY
Dept. A, Cleveland, Ohio

THIS Magazine is a product of our plant.

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A. J. SHOWALTER CO.
Dalton, Georgia
"The House of Better Service and Prices"

VOGEL PATENTED

Frost Proof Closets

350,000 giving satisfaction. Save Water; Require no Pit; Simple in the extreme. The most durable water closet made. In service winter and summer.

Enameled Roll flushing rim bowls.
Heavy brass valves.
Strong hardwood seat.
Galvanized tank.
Malleable seat castings will not break.
Tested under hydraulic pressure before leaving factory.

ASK YOUR JOBBER

JOSEPH A. VOGEL CO.
WILMINGTON
DELAWARE

Tough Tests for TUPELO

"THE HARD SOFT WOOD."

For a factory floor where the wear is **hard**
and continuous—

For a warehouse floor where the wear is **harder**
because of heavy loads coming and going—

For a platform, where the wear is **hardest**
with heavy truck wheels constantly rolling back and forth—

TUPELO "THE HARD-WEAR" LUMBER TUPELO "THE HARD-WEAR" LUMBER

stands the gaff, because of its tough, closely "knitted" or "involved" grain, which prevents it from "slivering" or "kicking" up.

TUPELO is good looking, too. Takes a fine finish.

Before placing an order for FLOORING for any use, write us and get the complete facts about TUPELO.

SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION
805 Poydras Bldg., New Orleans, La., or 805 Graham Bldg., Jacksonville, Fla.

LOGEMANN
BALING-PRESSES

For Waste—

Hand-operated Balers—
Deep-box power Balers—
Hydraulic Balers—

For Finished Goods—

Hand-operated Balers—
Power toggle-lever Balers—
Hydraulic high-density Balers—

For Yarns—

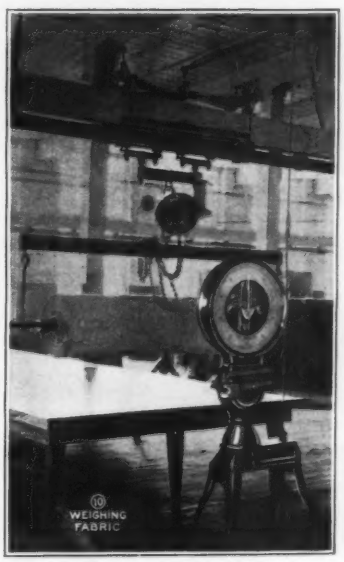
High-density power Balers—

There is a LOGEMANN baler for every purpose.

Write for details specifying your needs.

LOGEMANN BROTHERS CO.
3102 BURLEIGH ST. MILWAUKEE, WIS.

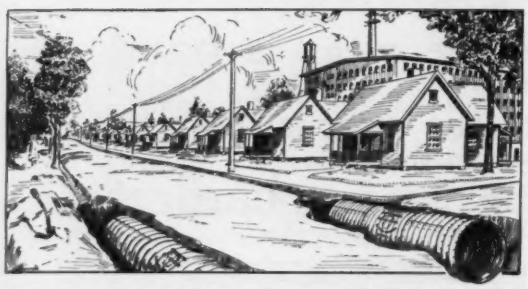
Automatic Scales
For Weighing and Checking



Raw Material
Sorts
Soap, Alkali and Dyes
Balls and Sliver
Test Pieces
Tops
Laps
Bobbins
Roving
Yarn
Yardage
Section Beams
Shipments
And for many other purposes

Toledo Scale Company, Toledo, Ohio
Canadian Toledo Scale Co., Limited, Windsor, Ontario
Largest Automatic Scale Manufacturers in the World
106 Sales Rooms and Service Stations in the United States and Canada. Others in thirty-four foreign countries

DRAINAGE NO LONGER A PROBLEM



Persons familiar with the problems of road building know that Carolina Metal Culverts last longer because they are made of the very best copper bearing metal and are entirely rust resisting.

The process of manufacturing of Carolina Metal Culverts is exacting, all base metal impurities are eliminated, copper is added in the right proportion which insures permanency—in exact accordance with the specifications of the State Highway Commission and the United States Government.

Use Carolina Metal Culverts in "Road Building For Tomorrow," they are economical because they are permanent.

Carolina Metal Culvert Company

Office and Works

SALISBURY, NORTH CAROLINA

SPECIFY AND USE

Royal Cement

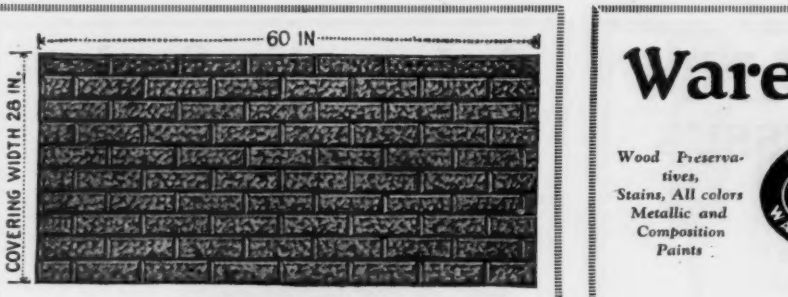
Manufactured by the wet process, insuring absolute uniformity. Tested in our laboratory once every sixty minutes.

Used in the largest construction jobs in the South.

300,000	Bbls.	in	Power	Dam,	Ladds, Tenn.
150,000	"	"	"	"	Ocoee, Tenn.
500,000	"	"	"	"	Alcoa, Tenn.
75,000	"	"	"	"	Bayview, Ala.

Dixie Portland Cement Co.

Chattanooga, Tennessee



Steel Siding

THE style shown above is our Pressed Brick Siding, painted and galvanized No. 24 Gauge or lighter. 8-6/10 sheets per square. Pattern is exact size pressed brick, 2⅝" x 8½".

We also manufacture other styles in standard sizes—corrugated pattern and v-crimp, lengths up to 12 feet.

Skilled engineers and architects are at the service of Southern mills ready to work out your plans and make valuable suggestions in the use of any of our products, which include:

DIXIE VENTILATORS
PORTABLE ALL-STEEL GARAGES
SLIDING FIRE-PROOF DOORS
METAL FRAME WIRE GLASS WINDOWS
UNDERWRITERS TIN CLAD DOORS AND SHUTTERS
GALVANIZED GUTTERS AND FITTINGS
GALVANIZED PIPE
AND FITTINGS
GALVANIZED WALL TIES AND PLUGS
GALVANIZED METAL SHINGLES
GALVANIZED CORRUGATED SIDING
GALVANIZED ROOFING
GALVANIZED PRESSED BRICK SIDING
GALVANIZED CORRUGATED SHEETS
GALVANIZED VALLEY
ROLLS AND RIDGE ROLLS
GALVANIZED TANKS
METAL CEILINGS
METAL CORNICES
METAL SKYLIGHTS
COMPOSITION ROOFING
SLATE ROOFING
ASPHALT SHINGLES
BLOW PIPES
SMOKE STACKS
ETC., ETC.

Bowman-Dozier Mfg. Co.

Manufacturers—Contractors—Sheet Metal Products

ATLANTA, GA., U. S. A.

Ware Paint Co.

Wood Preservatives, Stains, All colors Metallic and Composition Paints

SAVE THE SURFACE WITH WARE WEATHER PAINTS TRADE MARK REG.

Barn Paints, Roo Coating Roofing and Roofing Materials

Atlanta, Ga.

Defeats the Costly Ravages of Weather and Wear

Makes all surfaces—wood, metal or composition — moisture proof; rust proof; rot proof.

Adds years of serviceable life to every part of the mill. Best of insurance against replacement or repair costs.

Used and recommended by Industrial Plants and Cotton Mills, everywhere.

Distributors of FLINTKOTE Roofing.

Our Application Department will be glad to give you estimates on applying new roofs.

Our Service Department at your call—any time—anywhere.

Three Textile plants enclosed with Cyclone Fence. 75 per cent of the fenced textile mills have this fencing.

Cyclone Invincible Chain Link Fence enclosing property of Equinox Mill, Anderson, S. C.

Cyclone Invincible Chain Link Fence enclosing property of International Cotton Mills, LaGrange, Ga.

Cyclone Non-Climbable Chain Link Fence enclosing property of Brookside Mills, Knoxville, Tenn.

GALV-AFTER FENCE

Here is the practical fence for the textile mill. Does not require annual painting or other upkeep. This saving soon repays the entire cost of the fence.

Cyclone GALV-AFTER Fence is heavily Hot-Dip Zinc Coated (or HOT GALVANIZED) AFTER Weaving. Ordinary fence fabric is made of commercial wire "galvanized" before weaving. Only a light coating of zinc is applied to minimize cracking in the process of weaving.

A zinc coating five times heavier is applied to Cyclone GALV-AFTER Fence fabric. Every point on the fabric is perfectly covered. The result is a fabric that experts agree will last many years longer.

Cyclone Service solves any fencing problem. Our Engineers will make recommendations and furnish estimates of cost without obligating you in any way. Write nearest offices for complete information about this exceptional fence and fencing service. Address Dept. 35.

CYCLONE FENCE COMPANY

Factories and Offices:

Waukegan, Ill.; Cleveland, Ohio; Newark, N. J.; Fort Worth, Texas; Oakland, Cal. (Standard Fence Co.); Portland, Ore. (Northwest Fence & Wire Works).

Cyclone "Red Top" Fence and Products

The Mark of Quality Fence and Service

Cyclone Fence

PROPERTY PROTECTION PAYS

A Real Service

Permanently Linked With the Interests of Southern Mills

For over a quarter of a century, the J. B. McCrary Company have been purveyors of progress and prosperity in civic improvement. We do not pose as public benefactors nor purveyors of charity, but believe in helping ourselves by adding to the welfare of humanity.

Our business is to act as engineers, architects, financiers, contractors and supply municipal improvements for cities, towns, small municipalities and mill villages. Our aim is to give the best possible service at the lowest possible cost and add to the health, wealth and happiness of the mill and its employees.

Our record throughout the Southern States is an open book. We have designed or built over 700 water, light and sewer systems for Southern communities and over 5000 miles of hard surface street paving and highways amounting to over Two Hundred Millions of Dollars.

Our operations are based on scientific experiences. Hazard, risk and uncertainty are eliminated. McCrary experienced service can be secured at a fraction of the cost you would have to pay through any other source.

Call on us or have your architects call us in conference when village improvements are under consideration.

The J. B. McCrary Co.

Engineers, Contractors **ATLANTA, GA.**

Waterworks, Sewers, Pavements, General Village Improvements.

Electrical Service to Georgia

On General Electric Products

Our Atlanta and Savannah warehouses carry complete lines. Whatever your requirements — just so they are electrical— we can not only fill them, but insure prompt and efficient shipments.

We carry a particularly full line of textile mill equipment, illuminating units, lamps, motors, etc. Save yourself worry and inconvenience by drawing from our complete stock.

COMPLETE LINES OF

Wire
Conduit
Switches
Safety Devices
Fuses
Insulators
Lamps
Lighting Units
Fixtures
Fans
Street Lights
Motors
Brushes
Etc.
Anything Electrical

QUICK DELIVERY

CARTER ELECTRIC CO.

Distributors

ATLANTA SAVANNAH

ELECTRICAL SUPPLIES

GENERAL ELECTRIC CO.'S PRODUCTS—MOTORS, WIRE, WIRING DEVICES, ELECTRICAL, PORCELAIN CONDUIT AND FITTINGS, TRUMBULL SWITCHES.

Complete Stocks in Columbia for Prompt Shipment.

DISTRIBUTING GE JOBBER

PERRY-MANN ELECTRIC COMPANY

COLUMBIA, S. C.

Zemco-lite

TRADE MARK

"The Cement Paint"

Means *LESS* Painting

WALLS and ceilings painted with ZEMCO-LITE require less repainting. Why? Because Zemco-lite with its aggregate of pure white Portland cement, when applied to the walls of your mill, is there to stay. Just like concrete it actually gets better with age.

The light-reflecting qualities of Zemco-lite will startle you, once you have it on your walls and ceiling. It is the one perfect mill white.

Many of the leading textile mills have adopted it as their standard wall coating.

Why not use Zemco-lite and put the savings in your pocket?

Where shall we send color card and prices?

Zemco-lite is also made in a variety of colors for every knd of interior or exterior painting. Color card will be gladly sent on request.

AMERICAN CEMENT PAINT CO. Chattanooga, Tenn.

Zemco-lite, being a perfect nonconductor of heat, makes an excellent covering for steam pipes. It is the most economical means of minimizing losses from steam radiation.

"Dixie's Reliable Roofers"

For over 42 years we have concentrated our efforts on roofing problems of all kinds. Our roofing experts are at your service in solving your problems, large or small.

Here are a few of the textile mills whose roofing problems have been solved by our specialists and whose roofs have been "Done by Murphy."

BIBB MFG. CO.
COVINGTON COTTON MILLS
MILL NO. 2 NEWNAN COTTON MILLS
MILL NO. 1 ANCHOR DUCK MILLS
WINNSBORO MILLS
SCOTTDALE MILLS
HILLSIDE COTTON MILLS
MILL NO. 1 AND NO. 2 TALLADEGA MILLS
ROYAL MILLS

No matter whether you want your roof patched or whether you desire your entire mill roofed, we can do it in a manner that will pleasantly surprise you. Economical? YES!

Call upon us.

Gravel and Slag Roofing
Waterproofing *Insulated Roofs*
Tar Concrete Floors

C. P. MURPHY'S SONS

Established 42 Years

ATLANTA, GA.

Time Tells the Cost of Electrical Systems

An electrical system installed on the hit-or-miss basis by ordinary electrical contractors is something you have not **paid** for after you've **bought** it—simply an obligation to continue an indefinite series of payments besides which the original investment will look like "small change."

Time tells the cost of an electrical system, and H. & G. Trouble-Proof Service will prove a paying investment in the long run. The cost of H. & G. Service in comparison with the cost of the original equipment is small, and the prevention of loss from breakdowns and repairs for years to come, which H. & G. Service insures, cannot be computed in mere dollars and cents.

HUNTINGTON & GUERRY,
INC.
GREENVILLE, S. C.

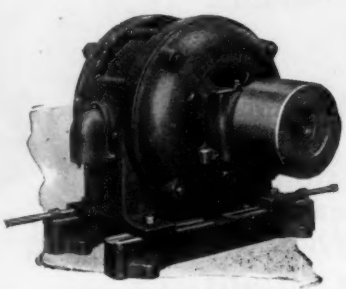
HUNTINGTON & GUERRY TROUBLE PROOF ELECTRICAL INSTALLATIONS

H & G TROUBLE-PROOF ELECTRICAL INSTALLATIONS

Polyphase Induction Motors

for Textile Service

Constant and Adjustable Speed



Type "AR" Squirrel Cage Motor

Type "AR" and "ARY" motors are designed with exceeding ruggedness, cast steel in place of cast iron being a prominent feature.

Method of ventilation is very effective resulting in even cooling and avoiding of "hot spots."

Bearings are of liberal design with spacious oil-wells.

Insulation is of highest grade, stator being treated with baked-on insulating varnish making the whole structure dust and moisture proof.

Motors are for floor or ceiling mounting being provided with very stiff and substantial rails.

Conduit terminal boxes are regular equipment.

Send for Bulletin

Type "ARY" Slip Ring Motor

ALLIS-CHALMERS PRODUCTS
Electrical Machinery
Steam Turbines
Steam Engines
Gas and Oil Engines
Hydraulic Turbines
Crushing and Cement Machinery
Mining Machinery

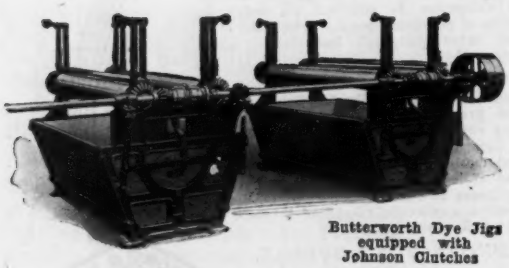
ALLIS-CHALMERS MANUFACTURING COMPANY

MILWAUKEE, WISCONSIN. U.S.A.

ALLIS-CHALMERS PRODUCTS
Flour and Saw Mill Machinery
Power Transmission Machinery
Pumping Engines-Centrifugal Pumps
Steam and Electric Hoists
Air Compressors - Air Brakes
Agricultural Machinery
Condensers

THE JOHNSON FRICTION CLUTCH

That Drive on Your Dye Jigs--- Has It Ever Caused Trouble?



Butterworth Dye Jigs equipped with Johnson Clutches

Friction Control Means Better Machinery

There are many drives in the dye house which can be handled most effectively by a good friction clutch. We design clutches to meet any requirements and are always glad to consult on your problems.

Write for our Catalog G

Are you using a jaw clutch that jerks and grabs—or a friction clutch that slips and falls down on the job? It is a common difficulty and a troublesome one.

H. W. Butterworth & Sons Company, builders of one of the oldest and best line of dyeing and finishing machinery, have found a decided advantage in the Johnson Clutch for this work. Dyeing establishments all over the country are now using Johnson Clutches on Butterworth machines in the arrangement shown here, and know from actua experience that they are capable of the finest service.

The Johnson Clutch has been applied with equally good results on other machines of this type, and on textile machinery generally—in the dye house and elsewhere. By its compact, enclosed design and its smooth and easy operation, it is admirably suited to the requirements of the texile shop.

Johnson Double Clutch as used on Butterworth Machines

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.

"DETROIT" BELT LACING is Still The Cheapest By Far

Ask any of our 14,000 users. Another important fact to remember is that

"DETROIT"

IS the only Wire Hook Belt Lacing that takes a staggered grip on the Belt.

Let us prove it by sending X-Ray photographs, they tell the health story.

Free Proof of Detroit Superiority

Reports of special investigations of Detroit Belt Lacing made by Gould & Company await your card or letter. They may help you reduce your belt lacing cost.

"After a thorough study of different methods of lacing belts, we have standardized on Detroit Belt Leaves and hooks. Detroit lacings average 1½ years' life, Detroit clips never pull out, and the Detroit method pays for itself every 34 days."

THE WILLYS-OVERLAND CO., Toledo, Ohio.

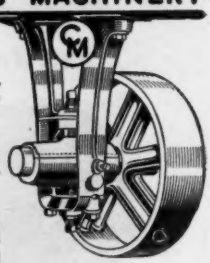
DETROIT BELT LACER CO.

DETROIT, MICHIGAN, U. S. A.

Branches in large cities—Absentees in foreign countries.

CRESSON-MORRIS

POWER TRANSMITTING MACHINERY



Power transmitting machinery
Shafting
Rope transmission
Machine moulded and cut iron and steel gears for heavy service.
Complete plant equipment.
Engineers; founders; machinists.
Sugar centrifugals.

CRESSON-MORRIS CO.

18th Street and Allegheny Ave.
PHILADELPHIA, PENNSYLVANIA

2139-X

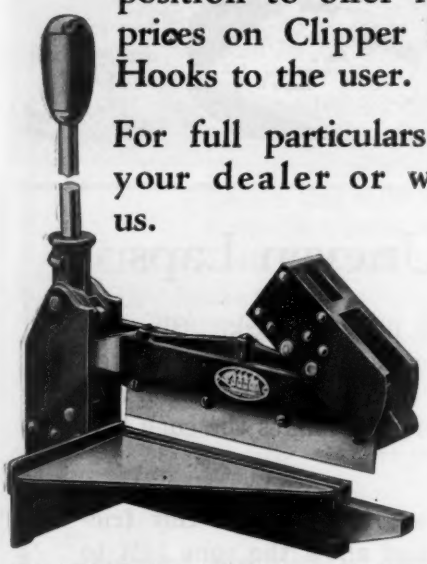
Sixty Years Experience as Engineers·Founders·Machinists

ANNOUNCEMENT

Greatly Reduced Prices on Clipper BELT HOOKS

Through increased production over a period of years our volume of business has grown to the extent that we are now in a position to offer lower prices on Clipper Belt Hooks to the user.

For full particulars ask your dealer or write us.



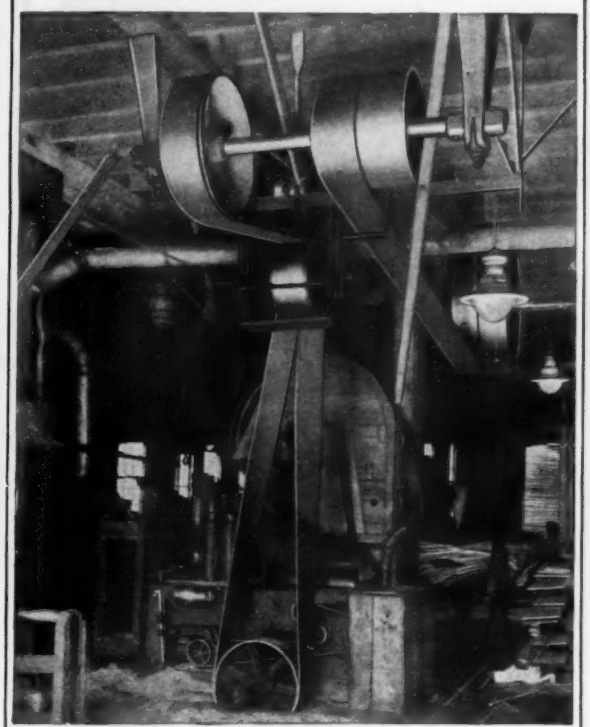
CLIPPER BELT CUTTER
MADE IN OPEN AND CLOSED MODELS

For cutting belting from the roll and for squaring or trimming belts up to 6 inches in width. Immediate delivery. —Any quantity.

Safety Feature: The knife *cannot be raised high enough* to become a *hazard.*

Descriptive literature mailed on request.

Clipper Belt Lacer Company
Grand Rapids, Mich.



"The finest piece of leather we have known in 58 years of business life"

THIS was the remark of the superintendent of a large factory. And a very fine tribute to that particular Graton & Knight Belt we considered it.

But the importance of this statement lies deeper than merely a compliment to that particular belt.

This belt is one of the Graton & Knight Standardized Series. It is the right quality, the right weight, the right flexibility for the job. It will produce the correct amount of power. When it is worn out, another —just like it in every particular—will replace it.

It has taken years of analyzation of power transmission conditions and problems to produce the Graton & Knight Standardized Series. In this series of belts we have developed one for every purpose. Many of the best belted plants in the country ask us to specify the belting for every pulley drive. This is a plan that has worked economies in scores of instances. We will gladly have a Graton & Knight engineer call on you and discuss your belting problems with you.

Send for the book "The Standardization of Belting." At the same time let us know what type of power transmission you are most interested in.

GRATON & KNIGHT
WORCESTER, MASS.

Nothing takes the place of Leather

THE "STRONGHOLD" PULL

A SPECIAL tanned leather belt, with 20% stronger grip than best oak belting. That means more output with the same power.

Rhoads Stronghold Belting is installed on a large number of textile drives, where it shows a lower cost per year than other belts, when you consider length of life, reduction of repairs and take-ups, and increased output.

Rhoads Belts are guaranteed to do this, under our "service and economy" guarantee.

Do you use Round Belt?
To get from two or five
times the usual belt life,
use Rhodes Tannate Round.

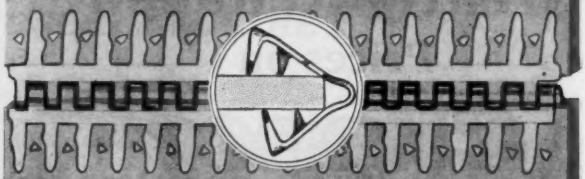
J. E. RHOADS & SONS

PHILADELPHIA: 29 N. Sixth St. CHICAGO: 316 W. Randolph St.
NEW YORK: 98 Beekman St. ATLANTA: 67 S. Forsyth St.
Factory and Tannery: WILMINGTON, DEL.

ALLIGATOR

TRADE MARK REG. U. S. PAT. OFFICE

STEEL BELT LACING



Uninterrupted Belt Service

When you lace a belt with Alligator Steel Belt Lacing, you probably will never have to touch the lacing again as long as the belt runs unless you want to shorten or lengthen the belt—and if you do, the joint is already half made. A separable hinge lacing, smooth and flexible. "Just a Hammer To Apply It."

FLEXIBLE STEEL LACING COMPANY
4619 Lexington St., Chicago, Ill.
In England at 135 Finsbury Pavement, London, E. C. 2

"Every Tooth A Vise"

For Every Size and Kind of Belt

TRADE

LOCKE

MARK

COMBINATION PRESSURE REGULATOR

The "Locke" Combination Regulator is the only regulator that is capable of controlling the pressure in large pipes, as heretofore the friction and power required to move the valves were sufficient to defeat all efforts at close regulation.

Indispensable for controlling large valves at the slightest variation of pressure.

Especially adapted for—
Controlling blower engines for forced draft.
No amount of resistance caused by dirt or friction will interfere with its close regulation.
It is also especially adapted for high pressure work and is the closest working pressure regulator we manufacture. It has been found impossible to construct these regulators in a compact form, as the heat in and about the large steam pipes soon works destruction to all the delicate regulating mechanism. For this reason the regulator proper is constructed so that it can be set at a distance from the valve, usually on the wall beyond the reach of this destructive agency. It will be found that this arrangement is indispensable, as has been fully demonstrated by trial.

This valve can be so constructed that it will not only act as a reducing valve but will keep a guard over its source of supply and if boiler pressure should be reduced below a certain point it will close the valve no matter how great the demand is for steam. It will again open when pressure rises above this certain point, again resuming its duty as a regulator.

LOCKE REGULATOR CO., Salem, Mass.
J. C. Lyden, 907 S. Tryon St., Charlotte, N. C.
New York Representatives: Rowland & Burns, 39 Cortlandt St.
No other Agency or Representative in New York City.

Uneven Laps

Cause uneven work. Slipping evener cone belts cause uneven laps. Friction in the apron and evener rolls makes the cone belt slip.

Ball bearings remove this friction and allow the cone belt to give the proper feed of cotton to the beater.

The installation is not expensive and is used on hundreds of lappers.

AldricH MachinE

Ball WorkS Bearings
Greenwood, S. C.

MOCCASIN SELF-OILING BUSHING

(Patented October 6, 1914.)

USES LESS OIL —AND USES IT ALL!

This cut shows how the capillary wooden feeders are inserted. The oil passes through these feeders in just the right quantity to the bearing surface. The oil is sealed in an oil-tight reservoir. There is no waste, no splashing, consequently there can be no damage to belting, floors or stock.

THE MOCCASIN

Eliminates the hot pulley.
Requires oiling only twice a year.
Lasts as long as the machine.
Keeps the spinning room clean.

HERE'S THE PROOF

Bibb Manufacturing Co.—
"Bushings have been in use three years and have given such perfect service that we are glad to recommend them to anyone."

Crystal Springs Bleachery—
"They are trouble killers."

Duplan Silk Works—
"These bushings have given us excellent satisfaction."

Erwin Cotton Mills—
"We are very much pleased with your bushings."

Hillside Cotton Mills—
"These bushings have given such excellent service we have substituted Moccasin Self-Oiling Bushings for plain bushings throughout the mill."

Massachusetts Mills In Georgia —
"Fills a long-felt want in the cotton mill."

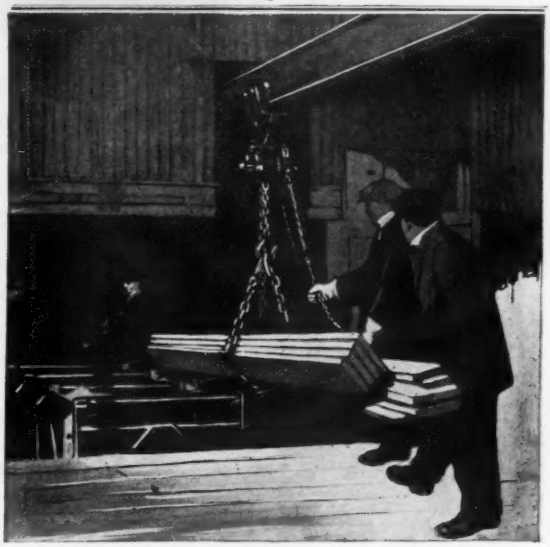
Rocky Mount Mills—
"We followed your advice and let them alone. They have not heated or shown any evidence of wear."

We have hundreds of testimonials similar to the above.

Write for full particulars.

Moccasin Bushing Co.
Chattanooga, Tenn.

CYCLONE HOISTS
HIGH SPEED



2 Men + 1 Cyclone = 16 Men

IN the plant of the Globe Malleable Iron and Steel Company, Syracuse, N. Y., two men use a Cyclone Hoist to lift and deliver 5000 lbs. of steel bar stock to the shearing tables in less than a minute.

It would take 16 men to do the same job by hand labor alone!

This Cyclone Hoist has now been in service 4 years! The actual dollars and cents saving accomplished by the Cyclone on this one simple operation runs into a big figure. Cyclones always show surprising savings whenever they replace "strong-arm" material handling methods, *in all lines of industry!*

Distributors everywhere to aid you in laying out hoisting systems and submit estimates. Catalog covering our 1 to 40 Ton Cyclone Hoists, Cranes, Trolleys, and Overhead Track Systems sent on request.

The Chisholm-Moore Mfg. Co.
Cleveland, O.

Branches: New York, Chicago, Pittsburgh

Hoists Cranes Trolleys
Overhead Track Systems

YOUNGSTOWN

Builders of Heating, Humidifying and Power systems have installed many thousands of tons of

YOUNGSTOWN PIPE

in the great cotton mills of the South. These firms chose "Youngstown" because they had the facilities and knowledge necessary to select the best. The high reputation of their product is in part due to the use of the best pipe that could be secured. You may not be able to discriminate as these manufacturers do, for all pipe looks pretty much alike; but you can at least follow their example and be assured the best that is to be had.

THE YOUNGSTOWN SHEET & TUBE CO.

YOUNGSTOWN, OHIO

DISTRICT SALES OFFICES:

BOSTON—120 Franklin St.
NEW YORK—30 Church St.
PHILADELPHIA—Pennsylvania Bldg.
ATLANTA—Healey Bldg.
PITTSBURGH—Oliver Bldg.
CLEVELAND—Leader-News Bldg.
DETROIT—2021-22 First National Bank Bldg.
CLEVELAND—1038-40 Hanna Bldg.
CINCINNATI—1004 Union Trust Bldg.
CHICAGO—Conway Bldg.
ST. LOUIS—1139 Olive St.
DENVER—First Nat'l Bank Bldg.
DALLAS—1401-2 Magnolia Bldg.
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Their simplicity of design, compactness, high grade materials, renewability of all parts and the facility with which they may be assembled or disassembled for cleaning and repair, insure the maximum durability, serviceability and economy in maintenance, warranting their adoption for any service—steam, water, gas, oil, etc.—where the pressure does not exceed 100 pounds.
Procurable in the Iron Body Bronze Mounted Pattern—or for handling liquids which attack bronze alloys—in the All Iron Pattern, sizes ½ to 6 inches inclusive.
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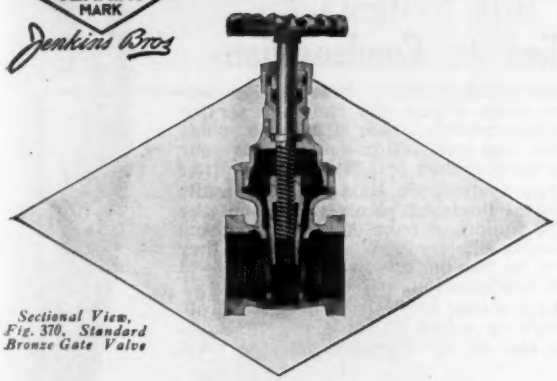
Fig. 205
IRON BODY BRONZE MOUNTED

Made for maximum service not merely the average

TRADE JENKINS MARK

Jenkins Bros



Sectional View, Fig. 370, Standard Bronze Gate Valve

Fig. 103, Screwed, Standard Bronze Angle Valve.

Fig. 352, Screwed, Standard Bronze Swing Check Valve.

Fig. 325, Screwed, Standard Iron Body Gate Valve.

Long Service True Valve Economy

Jenkins Valves are built to stand severe strains and hard usage. Each valve in all its parts is designed, made, tested, and guaranteed for the maximum service, not merely the average. You will find that their long life provides true valve economy.

Reliability and freedom from costly repairs and replacements make it pay to standardize on Jenkins Valves.

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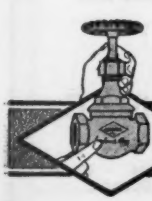

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There is a Racine H. S. Metal cutting machine for every metal cutting requirement.

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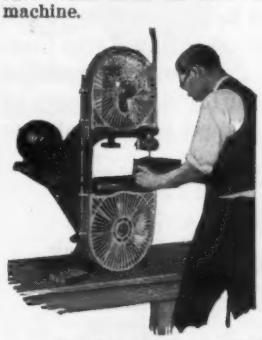
Cut more accurately, much faster and at far less cost than any other machines on the market.
Send for a sample from six-inch stock and see the accurate work done on this scientifically designed cutting machine.



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Built to cut every material, wood, soft metal or steel. Two speeds, ball-bearing mounted wheels are vibrationless, — saws will not crystallize, a machine that is cutting costs for dozens of manufacturers. Let us send you our bulletin—better yet, arrange for a demonstration.

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Steam and water make a bad mixture. When steam condenses in your slashers, stock dryers, dry cans and service heaters the resulting water retards steam circulation, cools your equipment, prevents heat transfusion and reduces your daily output. Drain the condensation and the trouble ends.

Morehead Back-to-Boiler Systems are giving perfect results for this purpose in several thousand plants throughout the country. They drain the equipment from end to end, raising temperatures and increasing efficiency. When advisable they return the condensation to the boilers—without pumps—at the high temperature of condensation.

Morehead engineers have solved hundreds of drainage problems and will gladly work on yours. What has been accomplished in other cases can be accomplished in your own. Write for details.

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POSITIVELY DRAINS ALL TYPES OF STEAM APPARATUS. DELIVERS CONDENSATION AND FEED WATER TO BOILERS UNDER ALL CONDITIONS AT MAXIMUM TEMPERATURE

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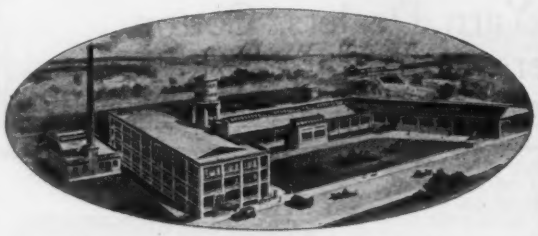

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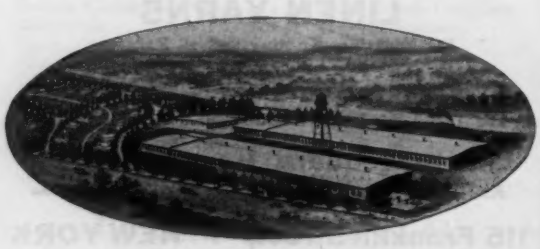

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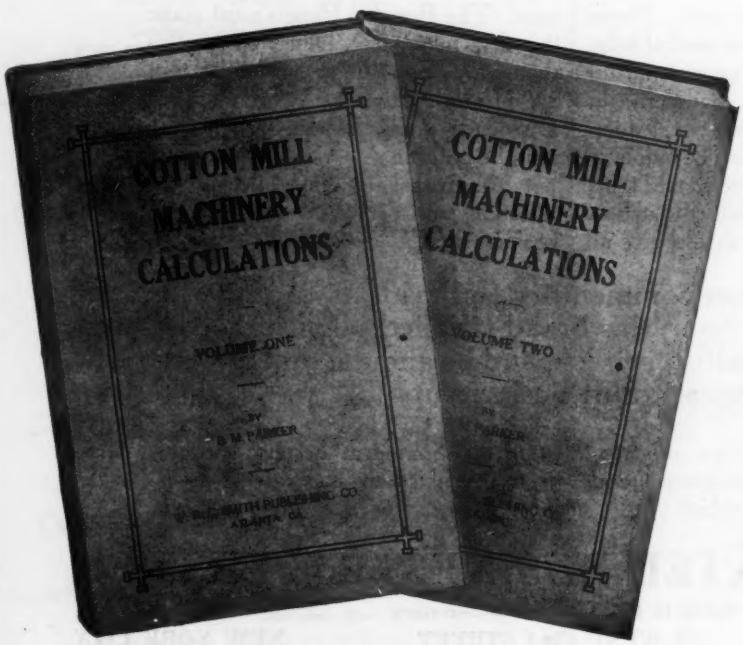

EVERY Textile Man should have these reference books. They cover in a detailed and thorough manner all calculations necessary to be made on any cotton mill machinery manufactured in the United States and constitute one of the best references on this subject obtainable.

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>
> "This is a time when we should think how much we can give, rather than how much we can get. We should give all that we can first, hoping that there may be a margin of profit.
>
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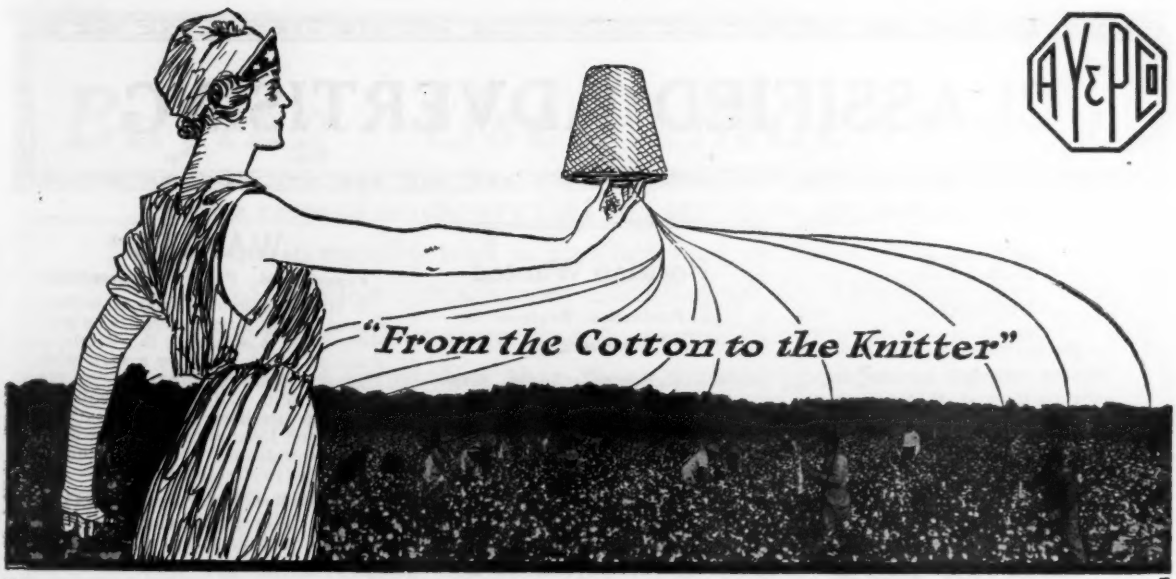

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Rhoads & Sons, J. E.

BELTING—ROPE.
(See Rope Transmission.)

BELT CONVEYORS.
Dodge Mfg. Co.
Fulton Supply Co.
Link-Belt Company.
Morse Chain Co.

BELT DRESSING.
Bond Co., Chas.
Dixon Crucible Co., Jos.
Fulton Bag & Cotton Mills.
Graton & Knight Mfg. Co.
Rhoads & Sons, J. E.
Williams & Sons, I. B.

BELT FASTENERS.
Clipper Belt Lacer Co.
Detroit Belt Lacer Co.
Flexible Steel Lacing Co.
Fulton Supply Co.

BELT LACING (LEATHER).
Bond Co., Chas.
Dodge Mfg. Co.
Fulton Supply Co.
Graton & Knight Mfg. Co.
Rhoads & Sons, J. B.
Williams & Sons, I. B.

BELT TIGHTENERS.
Dodge Mfg. Co.
Fulton Supply Co.
Link-Belt Company.
Rhoads & Son, J. E.
Wood's Sons Co., T. B.

BELT TIGHTENER DEVICE FOR CONE PICKERS.
Bahan Textile Mch. Co.

BENCHES MECHANICS' CLOTH INJECTORS, ETC.
Allen Co.
Lupton's Sons Co., David.

BENCH DRAWERS.
Lupton's Sons Co., David.

BENCH LEGS (PRESSED STEEL).
Lupton's Sons Co., David.

BENCHES (PARK AND PLAYGROUND).
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BINS (METAL).
Mills Co.

BLEACHERIES.
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BLEACHING KIERS.
Butterworth & Sons Co., H. W.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Textile Finishing Machry. Co.
Woolford Wood Tank Co., G.

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(See Dyeing, Bleaching and Finishing Machinery.)

BLEACHING, FINISHING AND SIZING MATERIALS.
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BLOWERS AND BLOWER SYSTEMS.
American Blower Co.
Buffalo Forge Co.
Carrier Eng. Corp.
General Electric Co.
Philadelphia Drying Mchry. Co.
Westinghouse Elec. & Mfg. Co.

BLOWPIPES (BRAZING, CUTTING, WELDING).
Oxweld Acetylene Co.

BOARDS (FILLNG).
Davis Mfg. Co., Frank.

BOARDS—FIBRE.
Standard Fibre Co.

BOARDS—FORM.
Pearson, Jos. T.

BOBBINS.
Brown Co., David.
Draper Corporation.
Fulton Supply Co.
Jordan Mfg. Co.
Lestershire Spool & Bobbin Co.
Parker Co., Walter L.
Shambow Shuttle Co.
U S Bobbin & Shuttle Co.
Whitin Machine Works.

BOBBIN HEADS.
Brown Co., David.
Jordan Mfg. Co.
U S Bobbin & Shuttle Co.

BOBBIN STRIPPERS.
Crompton & Knowles Loom Works.
Terrell Machine Co.

BOILERS.
Cole Mfg. Co., R. D.
International Engineering Wks., Inc.
Lombard Iron Works & Supply Co.
Old Hickory Powder Plant.
Toomey, Frank.
Walsh & Weidner Boiler Co.

BOILER COMPOUNDS.
Dixon Crucible Co., Jos.

BOILER FEED WATER PURIFICATION.
Hungerford & Terry, Inc.

BOILER ROOM FITTINGS AND SUPPLIES.
American Blower Co.
Crane Co.
Dixon Crucible Co., Jos.
Fulton Supply Co.
International Engineering Co.
Jenkins Bros.
Lunkenheimer Co.
Old Hickory Powder Plant.

BOILER GRATES AND STOKERS.
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BOILER TUBES AND FITTINGS.
Ryerson & Son, Inc., Jos. T.

BOLTS AND NUTS.
Ryerson & Son, Inc., Jos. T.

BONDS AND STOCKS (TEXTILE MILL).
American Trust Co.

BOX STRAPPING AND TIE BUCKLES.
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Allen Co.
Morris & Co., Inc.
Smith Mfg. Co.
Standard Fibre Co.

BOXES—PACKING.
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BRAID.
(See Tapes.)

BRAZING.
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BRICK (BUILDING & PAVING).
National Paving Brick Mfg. Asso.

BROKERS—COTTON.
(See Cotton Dealers & Brokers.)

BROKERS—STOCK.
(See Stocks and Bonds.)

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BRUSHES—MILL.
Atlanta Brush Co.
Mason Brush Wks.

BRUSHES—MOTOR AND GENERATOR (COMMUTATOR).
Dixon Crucible Co., Jos.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

BUCKETS AND PAILS—MILL.
Morris & Co., Inc.
Smith Mfg. Co.

BUCKETS—ELEVATOR AND GRAB.
Link-Belt Company.

BUCKLES—COTTON TIE.
(See Box Strapping and Ties.)

BUILDING CONTRACTORS.
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BUILDINGS (PORTABLE STEEL).
Dowman, George.
Dowman-Dozier Mfg. Co.

BUILDINGS (READY BUILT).
Minter Homes Co.

BUILDINGS (ALL STEEL).
Dowman, George.
Truscon Steel Co.
Maryland Metal Building Co.

BUILDING MATERIAL.
Birmingham Slag Co.
Bogart & Carlough Co.
Callahan Co., T. J.
Detroit Graphite Co.
DeVilbiss Mfg. Co.
Dixie Portland Cement Co.
Dowman-Dozier Mfg. Co.
Dowman, George.
Dufur & Co.
Kirkpatrick Lumber & Timber Co.
Lupton's Sons Co., David.
Maryland Metal Building Co
Minter Homes Co.
Murphy's Sons, C. P.
National Paving Brick Mfg. Asso.
Richardson Co.
St. Louis Surfacer & Paint Co.
Sanymetal Products Co.
Sonnebern Sons, Inc., L.
Southern Cypress Mfg. Asso.
Southern Wood Preserving Co.
Truscon Steel Co.
Variety Fire Door Co.
Wagner Mfg. Co.
Ware Paint Co.

BURR PICKERS.
Proctor & Schwartz, Inc.
Sargent's Sons, C. G.

BUSHINGS.
Moccasin Bushing Co.
Southern Spindle & Flyer Co.

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Butterworth & Sons Co., H. W.
Textile Finishing Mchry. Co.

CALENDER ROLLS.
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CALLING SYSTEM—INTER-TELEPHONE.
Carter Electric Co.

CAMPING EQUIPMENT, FURNITURE, STOVES, LIGHTS, ETC.
Smith Mfg. Co.

CANS (DRYING).
(See Drying Equipment.)

CARS AND TRUCKS—FIBRE.
(See Trucks.)

CARDS (BUSINESS OR CALLING—ENGRAVED).
Wiggins Co., John B.

CARBON BURNING APPARATUS.
Oxweld Acetylene Co.

CARBON RODS AND PASTE (WELDING).
Oxweld Acetylene Co.

CARBONIZING MACHINERY.
Klauder-Weldon Dyeing Machine Co.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Sargent's Sons & Co., C. G.
Textile Finishing Mchry. Co.
Tolhurt Mch. Works.

CARDING MACHINERY AND SUPPLIES.
Howard & Bullough.
Proctor & Schwartz, Inc.
Roy & Son, B. S.
Saco-Lowell Shops.
Southern Spindle & Flyer Co.
Whitin Machine Works

CARD & NAPPER CLOTHING.
Howard Bros. Mfg. Co.

CARD FEEDS.
Proctor & Schwartz, Inc.
Schofield Co., Wm.
Whitin Machine Co.

CARD GRINDING MACHINERY.
Proctor & Schwartz, Inc.
Roy & Son, B. S.
Whitin Machine Works.

CARPET MACHINERY.
Butterworth, H. W. & Sons Co.
Crompton & Knowles Loom Works.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Schofield, Wm., Co.
Textile Finishing Mchry. Co.

CARRIER APRONS.
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CARRIER SYSTEM.
Curtis Pneumatic Machry. Co.
Euclid Crane & Hoist Co.
Louden Machinery Co.
Wagner Mfg. Co.

CASES—WOODEN.
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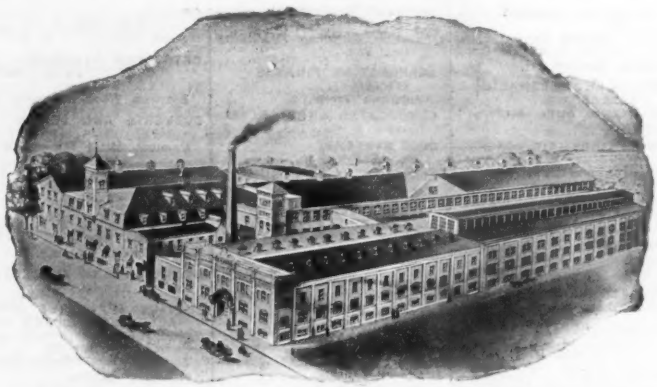
Briggs, Schaffner Co.
Cole Mfg. Co., R. D.
Cresson-Morris Co.
Lombard Fdry. & Mch. Co.
Rome Machine & Fdry. Co.
Walsh & Weidner Boiler Co.

CAUSTIC SODA.
(See Bleaching Materials.)



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CEMENT REINFORCEMENT.
Birmingham Slag Co.
Truscon Steel Co.

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American Cement Paint Co.
Detroit Graphite Co.
Dixon Crucible Co., Jos.
Hockaday Co.
Sonneborn Sons, Inc., L.
Wadsworth, Howland & Co., Inc.
Ware Paint Co.

CENTRAL STATION (ELECTRIC).
Tennessee Electric Power Co.

CENTRIFUGALS.
Cresson-Morris Co.
Fletcher Works.
Goulds Mfg. Co.
Schaum & Uhlinger.
Tolhurst Mch. Wks.

CHAIN DRIVES.
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CHAIN—BLOCK, BICYCLE, AUTO, ENGINE, AGRICULTURAL, ETC.
Diamond Chain & Mfg. Co.
Fulton Supply Co.
Link Belt Co.
Morse Chain Co.

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Bond Co., Chas.
Fulton Supply Co.
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CHLORINE GAS.
Electro Bleaching Gas Co.
Mathieson Alkali Works, Inc.

CLEANING MACHINERY (CLOTH AND YARN).
Rome Mch. & Fdry. Co.

CLEANING AND AERATING MACHINE FOR COTTON.
Murray Company, The.

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Bent & Co., Edw. H.
Phila. Felt Co.

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Firsching, J. A.
Foster Machine Co.
Wildman Mfg. Co.

CLOTH ROOM MACHINERY.
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Firsching, J. A.
Foster Machine Co.
Hopedale Mfg. Co.
Saco-Lowell Shops.
Textile Finishing Mchry. Co.
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Wildman Mfg. Co.

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Tolhurst Mch. Wks.

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Allis-Chalmers Mfg. Co.
Carlyle-Johnson Machine Co.
Cresson-Morris Co.
Fulton Supply Co.
Link-Belt Company.

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Carlyle-Johnson Mch. Co.

COAL AND COKE.
General Coal Co.

COAL AND ASH HANDLING MACHINERY.
Link-Belt Company.
Louden Machinery Co.

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COMBER AND COMBER SUPPLIES.
Foster Machine Co.
U S Bobbin & Shuttle Co.
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Curtis Pneumatic Mchry. Co.
Fulton Supply Co.
General Electric Co.
Goulds Mfg. Co.

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CONCRETE REINFORCEMENT.
Birmingham Slag Co.

CONCRETE REINFORCING STEEL.
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CONNECTORS—FRANKEL SOLDERLESS.
Westinghouse Elec. & Mfg Co.

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Dowman-Dozier Mfg. Co.
Sirrine & Co., J. E.
Truscon Steel Co.

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McCrary Co., J. B.

CONTRACTORS (WATERWORKS).
McCrary Co., J. B.

CONTRACTORS (SEWAGE).
McCrary Co., J. B.

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Foxboro Co., Inc.
General Electric Co.
Taylor Instrument Co.

CONVEYORS—BELT.
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American Supply Co.
Chisholm-Moore Mfg. Co.
Cresson-Morris Co.
Curtis Pneumatic Mchry. Co.
Dowman, George.
Euclid Crane & Hoist Co.
Fulton Supply Co.
Link-Belt Co.
Louden Machinery Co.
Mathews Gravity Carrier Co.
Morse Chain Co.
Phila. Drying Machinery Co
Proctor & Schwartz, Inc.
Saco-Lowell Shops.
Schofield, Wm. Co.
Wagner Mfg. Co.

CONVEYORS—PORTABLE.
Euclid Crane & Hoist Co.
Link-Belt Co
Mathews Gravity Carrier Co.

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Mathews Gravity Carrier Co.

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Buffalo Forge Co.

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Ernst & Ernst.

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Minter Homes Co.

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Murray Company, The.

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COTTON YARN AND CLOTH COMMISSION MERCHANTS AND DEALERS.
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Boger & Crawford.
Callaway Mills.
Carver-Beaver Yarn Co., Inc.
Fawcett, Hughes.
Florsheim, H. A.
Hunter Mfg. & Comm. Co.
Jamieson, J. B.
Lane & Co., J. H.
Meritzer, H. S.
Quissett Mill.
Tolar & Hart.
Weimar Bros.
Wellington, Sears & Co.
Whitman Co., Inc., Wm.
Woodward, Baldwin & Co.

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Beer & Co., H. & B.

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Atlanta Harness & Reed Mfg Co.
Auto Creel Corp.
Bahan Textile Mch. Co.
Barber-Colman Co.
Brown Co., David.
Butterworth & Sons, H. W.
Crompton & Knowles Loom Works.
Draper Corporation.
Dowman, George.
Dryer Corp. of Americas.
Eclipse Textile Devices, Inc.
Firsching Co., J. A.
Fletcher Works.
Foster Machine Co.
Foxboro Co., Inc.
Fulton Supply Co.
Harris Co., Geo. W.
Hopedale Mfg. Co.
Howard Bros. Mfg. Co.
Hunt Machine Co., Rodney.
Hyatt Roller Bearing Co.
Jacobs Mfg. Co., E. H.
Lestershire Spool Mfg. Co.
Lowell Crayon Co.
Mill Devices Co.
Mossberg Pressed Steel Corp
Parker Co., Walter L.
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Root Co.
Roy & Son, B. S.
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Schaum & Uhlinger.
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Shambow Shuttle Co.
Stafford Co.
Steel Heddle Mfg. Co.
Suter, Alfred.
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Textile Rubber Co.
Toledo Scale Co.
Tolhurst Mch Wks.
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Whitinsville Spinning Ring Co.

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Fletcher Works.
Foster Mch. Co.
Schaum & Uhlinger.

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Root Co.

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Eclipse Crayon Co.
Lowell Crayon Co.

CREELS.
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Suter, Alfred.

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Southern Wood Preserving Co

CULVERTS AND SEWER PIPE.
Carolina Metal Culvert Co.

CUTS FOR PRINTING.
Jacobs & Co.

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DECARBONIZING APPARATUS
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CUTTING APPARATUS (OXY-ACETYLENE & OXY HYDROGEN).
Oxweld Acetylene Co.
Standard Gas Products Co.

DELIVERY CASES.
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DESKS—FACTORY.
Allen Co.
Lupton's Sons Co., David.

DEXTRINES.
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DIES—STEEL.
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Crompton & Knowles Loom Wks.
Whitin Machine Works.

DOBBY CARDS.
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DOFFER FILLETS.
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DOFFING CARS.
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DOORS—STEEL.
Dowman, George.
Dowman-Dozier Mfg. Co.
Mills Co.
Lupton's Sons Co., David.
Variety Fire Door Co.

DRAINAGE ENGINEERS.
Carolina Metal Culvert Co.

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Jacobs & Co.

DRAWING FRAMES.
Howard & Bullough.
Saco-Lowell Shops.
Whitin Machine Works.

DRESSING ROOMS (METAL PARTITIONS).
Mills Co.

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Draper Corp.
Mossberg Pressed Steel Corp
Steel Heddle Mfg. Co.
Williams Co., J. H.

DRY CLEANING MACHINERY
Rome Machine & Fdry. Co.

DRYING APPARATUS.
American Blower Co.
Buffalo Forge Co.
Philadelphia Drying Mchry Co.
Proctor & Schwartz, Inc.

DRYING FORMS—HOSIERY.
Pearson, Jos. T.

DRYING MACHINERY AND EQUIPMENT.
American Blower Co.
American Laundry Mchry. Co
Butterworth, H. W., & Sons Co.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Sargent's Sons Corp., C. G.
Textile Finishing Machinery Co., The.
Tolhurst Machine Works.

DUST COLLECTORS.
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DUSTING MACHINERY.
Proctor & Schwartz, Inc.
Schofield & Sons, Wm.

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Boger & Crawford.
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Franklin Process Co.

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American Laundry Mchry. Co.
Butterworth & Sons Co., H. W.
Cole Mfg. Co., R. D.
Electro Bleaching Gas Co.
Firsching, J. A.
Fletcher Works.
Franklin Process Co.
Hightower Box & Tank Co.
Hungerford & Terry, Inc.
Hunt Machine Co., Rodney.
Klauder-Weldon Dyeing Mch. Co.
Phila. Drying Machinery Co.
Proctor & Schwartz, Inc.
Reliance Machine Works.
Rome Machine & Fdry. Co.
Schaum & Uhlinger.
Textile Finishing Machinery Co., The.
Tolhurst Machine Works.
Woolford Wood Tank Co., G.

DYEING MACHINES (PACKAGE AND SPOOL).
Franklin Process Co.

DYE BAGS OR NETS.
Smith Mfg. Co.

DYE STICKS.
Phila. Drying Machinery Co.

DYE VATS AND TUBS.
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Arabol Mfg. Co.
Arnold, Hoffman & Co.
Borne, Scrymser Co.
Bossen & Lane
DuPont de Nemours & Co., E. I.
Ciba Co., Inc.
Electro Bleaching Gas Co.
Fleischmann Co., The.
Ford Co., J. B.
Grasselli Chemical Co.
India Alkali Works.
Kali Mfg. Co
Klipstein & Co., A.
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Mathieson Alkali Works, Inc.
Metz & Co., H. A.
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Newport Chemical Wks.
Quaker City Chemical Co.
Roessler & Hasslacher Chemical Co.
New Brunswick Chemical Co.
Penick & Ford, Ltd.
Rohm & Haas Co.
Sonneborn Sons, Inc., L.
Staley Mfg. Co., A. E.
Stein, Hall & Co.
Turpass Chemical Co.
United Chemical Products Corp.
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ELECTRIC CONDUIT AND FITTINGS.
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ELECTRIC LAMP GUARDS.
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Huntington & Guerry, Inc.
McCrary Co., J. B.
Panton, Harrison D.
Perry-Mann Electric Co.

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(See Illuminating Engineers.)

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Buffalo Forge Co.
Carter Electric Co.
Cooper Hewitt Electric Co.
Curtis Co., The.
Cutler Works, George
Elwell-Parker Electric Co.
Euclid Crane & Hoist Co.
Fulton Supply Co.
General Electric Co.
Perry-Mann Electric Co.
Seawell, Luke.
Southern Elec. Supply Co.
Walsh & Weidner Boiler Co.
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(See Power.)

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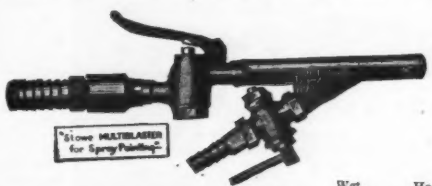

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FEEDERS.
(See Automatic Feeders.)

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Lennig & Co., Chas.
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Newport Chemical Wks.
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Quaker City Chemical Co.
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Rohm & Haas Co.
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Staley Mfg. Co., A. E.
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Warren Soap Mfg. Co.
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(See Hose—Fire.)

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Kirkpatrick Lumber & Timber Co.
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American Scrubbing Equipment Co.

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(See Scrubbing Powders.)

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(See Brushes.)

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(See Clutches—Friction.)

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Mills Co.
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Smith Mfg. Co.

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Fulton Supply Co.
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Southern Electric Supply Co.

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Dowman, George.

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Lunkenheimer Co.
Taylor Inst. Co.

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Fulton Supply Co.
Lunkenheimer Co.

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(See Dishes.)

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(See Lubricants.)

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(See Card Grinding Machinery.)

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(See Electric Lamp Guards.)

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(See Drying Forms.)

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(See Yarn Manufacturers.)

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Taylor Instrument Co.

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(See Extractors.)

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Steel Heddle Mfg. Co.

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Link-Belt Company.

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Lupton's Sons Co., David.
Mills Co.
Manufacturing Equip. & Eng'g Co.
Sanymetal Products Co.

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Draper Corporation.
Fletcher Works.
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Schaum & Uhlinger.
Stafford Co.

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LOOP PICKERS.
Jacobs Mfg. Co., E. H.

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LUBRICATORS.
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N. Y. & N. J .Lubricant Co.

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LUG STICKS.
Allen Co.

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Southern Cypress Mfg. Asso.
Southern Wood Preserving Co.

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Cresson-Morris Co.
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(See Yarn Manufacturers.)

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Hunter Mfg. & Comm. Co.

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METAL SIDING.
Dowman, George.
Dowman-Dozier Mfg. Co.

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(See Screens and Sieves.)

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Dowman-Dozier Mfg. Co.

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Foxboro Co., Inc.
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MILL ENGINEER.
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MILL VILLAGES.
(See Villages.)

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MILL WHITE PAINT.
(See Paint.)

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(See Films.)

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Fulton Supply Co.
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Jacobs & Co.
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Sanymetal Products Co.

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(See Partitions.)

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N. Y. & N. J. Lubricant Co
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(See Engines Oil.)

OILS—FINISHING.
(See Finishing and Sizing Materials.)

OIL CUPS.
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OIL PAPER.
Bradley Mfg. Co., A. J.

OIL PUMPS.
(See Pumps—Oil.)

OIL SEPARATORS.
(See Separators.)

OILING DEVICES.
(See Lubricators.)

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Proctor & Schwartz, Inc.
Saco-Lowell Shops.
Schofield Co., Wm.
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Dowman-Dozier Mfg. Co.
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Logemann Bros. Co.
Phila. Drying Mch. Co.
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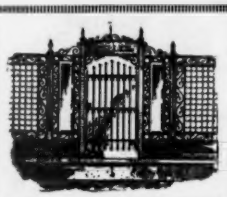

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Washburn, Inc.

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Washburn, Inc.

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Dowman-Dozier Mfg. Co.
Kirkpatrick Lumber & Timber Co.
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Richardson Co.
Southern Wood Preserving Co.
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Dowman, George.

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Sanymetal Products Co.
Vogel Co., Jos. A.

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Dowman-Dozier Mfg. Co.

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Dowman, Geo.
Dowman-Dozier Mfg. Co.

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(See Pumps—Steam.)

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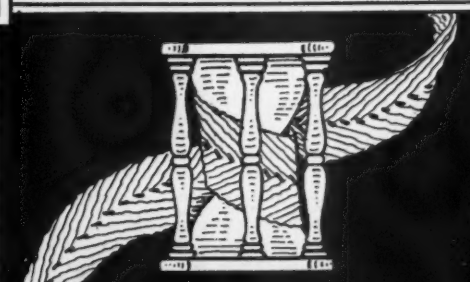

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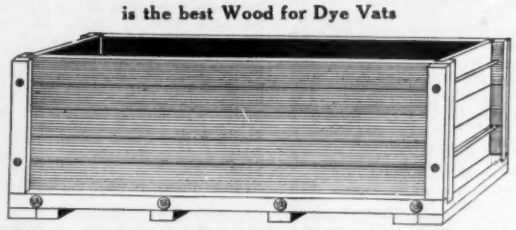

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OFFICE OF
BOARD OF EDUCATION
AND
SUPERINTENDENT ATLANTA PUBLIC SCHOOLS
ATLANTA, GA.

Southern Theatre Equipment Co.
Atlanta, Ga.

Gentlemen:--Regarding the educational value of the motion picture in public schools, I wish to call your attention to the following points:

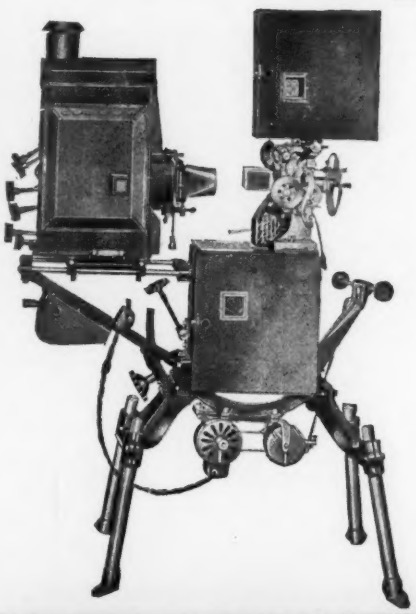
1, 2, 3, 4, and 5--(see previous ads)

6.- PROCESSES ARE SHORTENED AND SIMPLIFIED, allowing pupil (in this case, his mind) to accomplish a given task with less labor, do more work in less time, and approach each task with less fatigue and more enthusiasm.

A letter from a man who knows

You may use any or all of this letter as you desire.
Very truly yours,

Joe W. Coffman
Supervisor, Visual Instruction,
Atlanta Public Schools.



VISUAL EDUCATION with the motion picture has already proven its value in city schools, and it will prove of even greater value in village and community schools because it accomplishes even greater results with less time and less experienced teachers.

Through the courtesy of Mr. Coffman, we are presenting each month in paragraph form, parts of a very enlightening letter which he has written us, and through Mr. Coffman also, we are able to give our textile mill friends valuable help and suggestions regarding the use of this system in community school work, the selection of the proper films, in fact the solution of every problem which may present itself.

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